SONOMA COUNTY WATER AGENCY

2005 Urban Water Management Plan

DRAFT

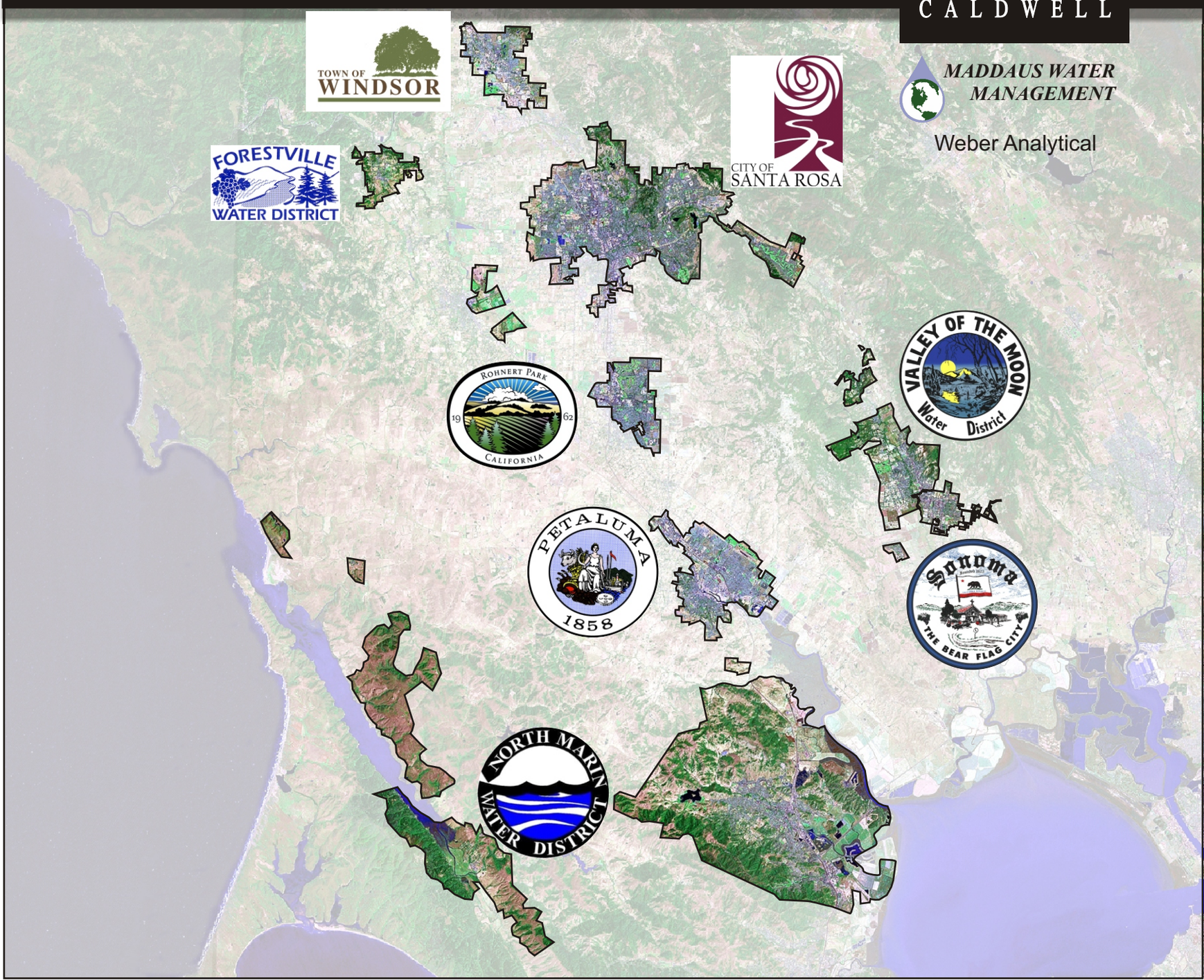
October 2006

Sonoma County Water Agency

BROWN AND CALDWELL

MADDAUS WATER MANAGEMENT

Weber Analytical



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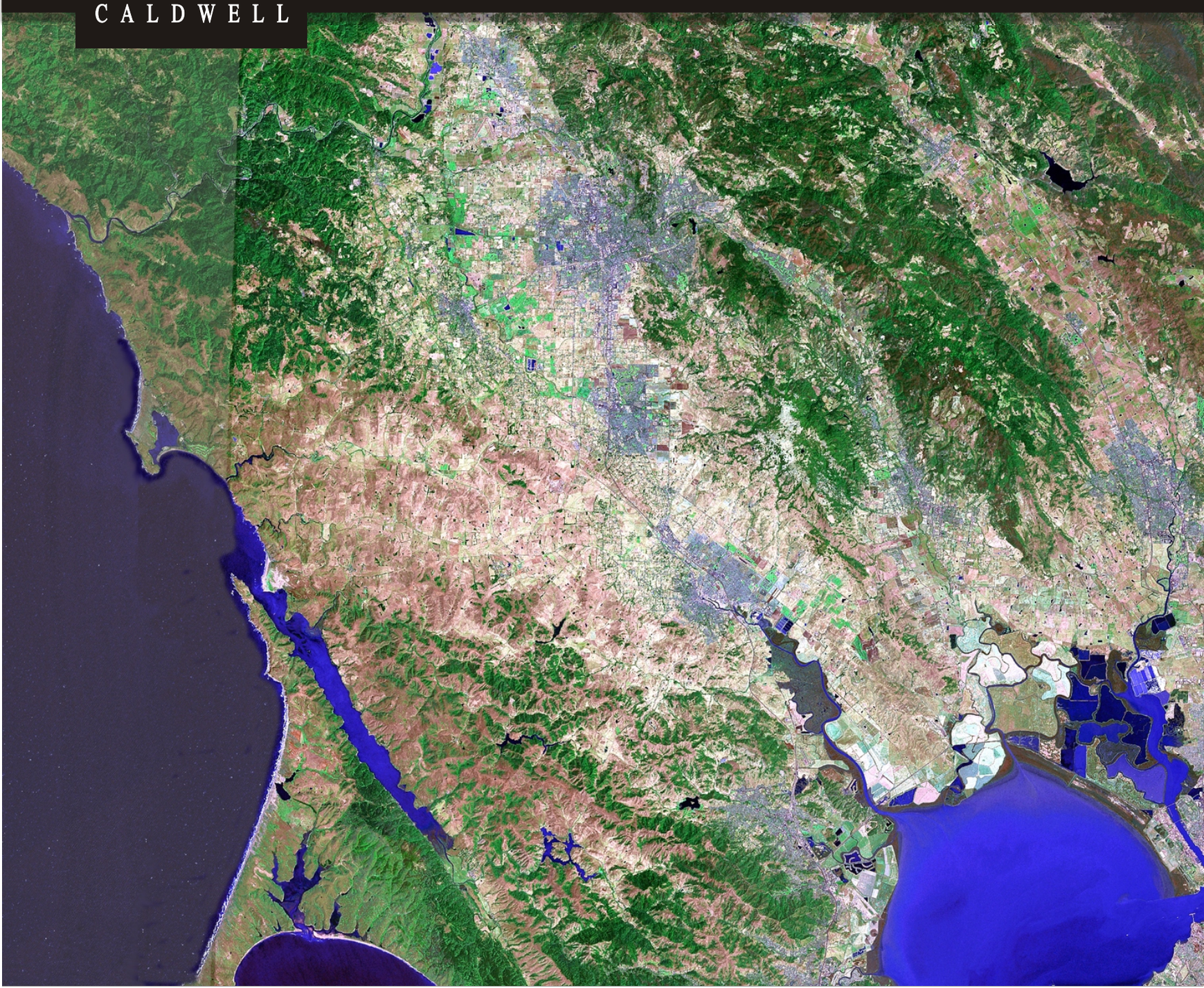

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October 30, 2006

BROWN AND CALDWELL

Mr. Matthew Damos, P.E.
Sonoma County Water Agency
404 Aviation Boulevard
Santa Rosa, California 95403

1017/127280.005

Subject: Sonoma County Water Agency (Agency),
Draft Urban Water Management Plan

Dear Mr. Damos:

Brown and Caldwell is pleased to submit this third draft submittal of the Urban Water Management Plan (report) for your review.

Please do not hesitate to contact me if you have any questions or comments at (916) 853-5306.

Sincerely,

BROWN AND CALDWELL

Paul Selsky

Paul Selsky, P.E.
Vice President

PS:DM:ds

Enclosure

SONOMA COUNTY WATER AGENCY

DRAFT
2005 URBAN WATER MANAGEMENT PLAN

October 2006

Prepared by

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LIST OF ACRONYMS AND ABBREVIATIONS

ABAG	Association of Bay Area Governments
Act	Urban Water Management Act
ac-ft	acre-feet
ac-ft/yr	acre-feet per year
Agency	Sonoma County Water Agency
bgs	below ground surface
BMP	best management practices
CEQA	California Environmental Quality Act
cfs	cubic feet per second
County	County of Sonoma
DEIR	Draft Environmental Impact Report
DHS	California Department of Health Services
DWR	California Department of Water Resources
DSS	Decision Support System
EIR	Environmental Impact Report
ESA	Endangered Species Act
ETo	evapotransporation
FERC	Federal Energy Regulatory Commission
GP	General Plan
gpd	gallons per day
MCL	maximum contaminant level
MG	million gallons
mgd	million gallons per day
MOU	Memorandum of Understanding
MSL	mean sea level
NMFS	National Marine Fisheries Service
PES	PES Environmental, Inc.
PG&E	Pacific Gas and Electric
Plan	Urban Water Management Plan
PVP	Potter Valley Project

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

Restructured Agreement	Restructured Agreement for Water Supply
RRSyM	Russian River System Model
SWRCB	State Water Resources Control Board
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
Water Project	Water Supply, Transmission, and Reliability Project
WSA	Rohnert Park City-Wide Water Supply Assessment

SECTION 1
INTRODUCTION

This Urban Water Management Plan (Plan) addresses the Sonoma County Water Agency (Agency) water system and includes a description of the water supply sources, magnitudes of historical and projected water use, and a comparison of water supply to water demands during normal, single-dry, and multiple-dry years. The Agency provides water principally from the Russian River to retail water customers in Sonoma and Marin Counties, California.

This section provides background information on the Plan, an overview of coordination with other agencies in the service area, and a description of public participation and Plan adoption.

1.1 Urban Water Management Planning Act

The Agency Plan has been prepared in accordance with the Urban Water Management Act (Act), as amended, California Water Code, Sections 10610 through 10656. The Act requires every urban water supplier that provides water for municipal purposes to more than 3,000 connections, or supplying more than 3,000 acre-feet (ac-ft) of water annually, to adopt and submit a plan every five years to the California Department of Water Resources (DWR). This plan serves as a long-range planning document for water supply.

1.2 Resource Maximization and Import Minimization

Water management tools have been used by the Agency to maximize water resources. The Agency does not import water. The Agency has been working with its water contractors and other Agency customers to implement water conservation measures. Additionally, the Agency is working with the United States Geological Survey (USGS) to conduct groundwater basin studies in Sonoma County. The Agency is participating in the preparation of two integrated regional water management plans, one for the North Coast Hydrologic Region (Region 1) and one for the San Francisco Bay Hydrologic Region (Region 2), because the Agency provides water supply within both hydrologic regions. By working to integrate water resources planning across jurisdictional boundaries, the Agency can maximize water resources.

1.3 Coordination

The Act requires the Agency to coordinate the preparation of its Plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies. The Agency coordinated the preparation of its Plan with its water contractors and other Agency customers, as well as the wastewater agencies within the service area. In addition, the Agency coordinated the preparation of the water demand projections in this Plan with the Association of Bay Area Government's (ABAG) demographic projections, the draft Sonoma County General Plan, and the draft Marin County-wide Plan. Table 1-1 provides a summary of the Agency's coordination with the appropriate agencies.

Table 1-1. (DWR Table 1) Coordination with Appropriate Agencies

	Contractors and Other Agency Customers										Wastewater Agencies							Other
	City of Cotati	North Marin Water District	City of Petaluma	City of Rohnert Park	City of Santa Rosa	City of Sonoma	Valley of the Moon Water District	Town of Windsor	Forestville Water District	Marin Municipal Water District	Novato Sanitary District	Petaluma Wastewater Treatment Facility	Santa Rosa Subregional Reclamation System	Sonoma Valley County Sanitation District	Town of Windsor Water Reclamation Division	County of Marin	County of Sonoma	Public Involvement
Participated in developing the Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
Commented on the draft	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
Attended Agency public meetings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
Held public meeting	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓								
Was contacted for assistance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Was sent a copy of the draft Plan	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	
Was sent a notice of intention to adopt	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Not involved / No information																		

1.4 Public Participation and Plan Adoption

The Agency encouraged community and public interest involvement in the Plan update through public hearings and inspection of the draft document. Public hearing notifications were published in the _____. A copy of the published Notice of Public Hearing is included in Appendix A. The hearing provided an opportunity for all residents and employees in the service area to learn and ask questions about their water supply and the Agency's plans for providing a reliable, safe, high-quality water supply. Copies of the draft Plan were made available for public inspection at the Agency's Administration building, the Clerk of the Board of Directors, and the Agency's web site.

This Plan was adopted by the Agency's Board of Directors on _____, 2006. A copy of the adopted resolution is provided in Appendix A.

1.5 Plan Organization

This section provides a summary of the sections in the Plan. Section 2 provides a description of the service area, climate, water supply facilities, and transmission system. Section 3 presents historical and projected water use. Surface and groundwater supplies are described in Section 4. Section 5 describes recycled water. Section 6 addresses water conservation and water shortage contingency planning. Section 7 provides a comparison of future water supply to demand. Appendices A through C provide relevant supporting documents.

1.6 Assumptions

The evaluation and conclusions in this Plan are based in part upon assumptions (identified below and discussed in subsequent chapters) about the most likely outcome of decisions of regulatory agencies over the 20-year planning period. The Agency recognizes that regulatory agencies may make different decisions or take different actions than those assumed by the Agency, which may affect the availability of water and the adequacy of the Agency's transmission system. The Agency concludes, given the facts currently available, that the assumptions in this Plan are reasonable, but will monitor the assumptions and update subsequent Plans as necessary.

Local planning agencies choosing to consider this document as a reference for analysis of water availability are encouraged to check with the Agency or their appropriate water contractor for updated information regarding the assumptions on which this Plan is based.

In its analysis of the availability of water for diversion from the Russian River by its transmission system, the Agency assumes that the listing of three salmonid species as threatened or endangered under the federal Endangered Species Act (ESA) will not reduce the amount of water it can supply, principally from the water stored in Lake Sonoma (Warm Springs Dam), using its Russian River diversion facilities. The Agency also assumes that PG&E's existing Federal Energy Regulatory Commission (FERC) license for the Potter Valley Project (PVP) will not be modified, or that any license modifications (and the terms of any new license) will not reduce the amount of water available for diversion by the Agency.

With respect to the Agency's ability to deliver water, the Agency assumes that it will construct and operate facilities described in its Notice of Preparation of the environmental impact report (EIR) for the Water Supply, Transmission, and Reliability Project (Water Project). State and federal agencies, including the National Marine Fisheries Service (under the ESA) and the State Water Resources Control Board (SWRCB) (which issues water rights permits) could impose requirements that would change the Water Project.

If construction and operation of the Water Projector an alternative project to meet the demands of the water contractors is delayed, deliveries by the Agency to its water contractors will be limited by any then-existing constraints on the capacity of its transmission system and its existing water rights.

SECTION 2
DESCRIPTION OF EXISTING WATER SYSTEM

This section describes the Agency's service area, the climate in that service area, and the Agency's water supply facilities. Section 4 of the plan describes the quantities of water available to the Agency.

2.1 Description of Service Area

The Agency's water service area covers a large part of Sonoma County, as well as the northern portion of Marin County. The Agency supplies water diverted from the Russian River to several categories of customers, including "contractors," "other Agency customers," and the Marin Municipal Water District. The "contractors" consist of the North Marin Water District, City of Petaluma, City of Rohnert Park, City of Santa Rosa, City of Sonoma, Valley of the Moon Water District, Town of Windsor, and City of Cotati. The "other Agency customers" consist of the Forestville Water District, the California-American Water Company, and several water companies and public agencies. The Agency also supplies water through its transmission system to the Marin Municipal Water District. The relationship between the Agency, its contractors, other Agency customers, and Marin Municipal Water District is detailed in the Restructured Agreement for Water Supply dated June 2006.

2.2 Climate

The source of the Agency's water supply, the Russian River watershed, is influenced by its proximity to the Pacific Ocean. In common with much of the California coastal area, the year is divided into wet and dry seasons. Approximately 93 percent of the annual precipitation normally falls during the wet season, October to May, with a large percentage of the rainfall typically occurring during three or four major winter storms. Winters are cool, and below-freezing temperatures seldom occur. Summers are warm and the frost-free season is fairly long. Average annual precipitation over the Russian River watershed is 41 inches, ranging from about 22 inches over the southern portion of the region to over 80 inches in the northern area. The quantity of rainfall over the watershed increases with elevation, with the center of greatest precipitation occurring over the highest ridges. A significant part of the region is subject to marine influence and fog intrusion. Average annual

rainfall ranges from 21 to 30 inches within the Sonoma County service area. Temperatures range from 16º to 110ºF. Prevailing winds are from the west and southwest. Table 2-1 summarizes the monthly average evapotranspiration rates (ETo) at the Santa Rosa station, and monthly average rainfall and temperatures at the Sonoma Station.

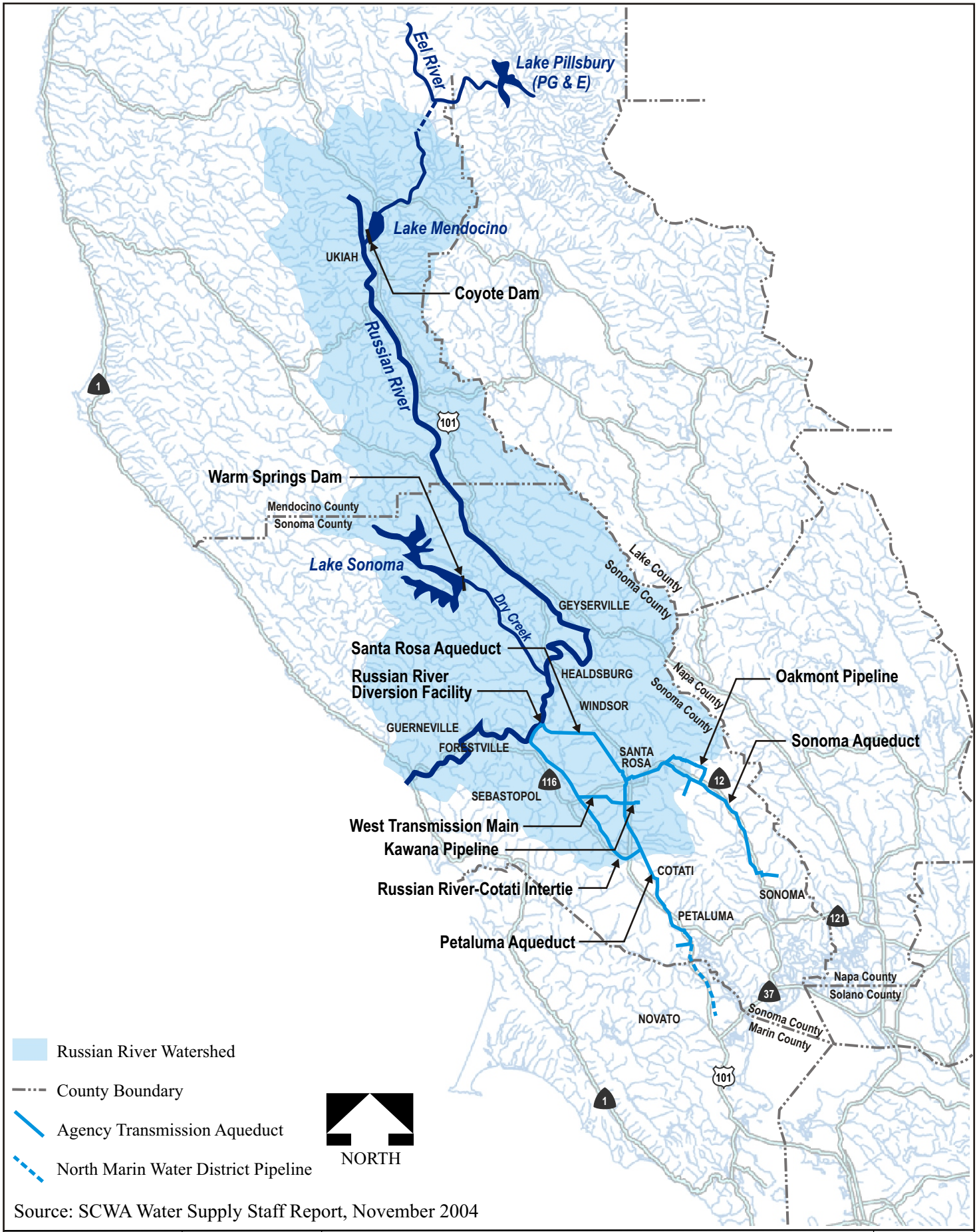
Table 2-1. (DWR Table 3) Climate

	Standard average ETo[a], in.	Average rainfall[b], in.	Average temperature[b], ºF
January	0.82	6.44	47.23
February	1.44	5.26	51.27
March	2.87	3.89	53.56
April	4.31	1.83	56.56
May	5.26	0.69	61.48
June	6.14	0.25	67.07
July	6.30	0.03	70.10
August	5.76	0.11	69.80
September	4.25	0.31	68.06
October	3.10	1.58	62.23
November	1.38	4.03	53.14
December	0.86	5.20	47.33
Annual	42.49	29.63	58.95

[a] Data represents the monthly average from January 1990 to October 2005 and was recorded from Santa Rosa CIMIS Station 83. ETo, or evapotranspiration, is the loss of water from evaporation and transpiration from plants.
[b] 1952-2005 data recorded at Sonoma Station from NOAA website www.wrcc.dri.edu

2.3 Surface Water Supply Facilities

The Russian River provides most of the Agency's water supply. Groundwater supply is also provided, as described in Section 2.4. Some of the Agency's contractors, other Agency customers, and the Marin Municipal Water District utilize other water supplies including local surface water, local groundwater, and recycled water. These local supplies are summarily accounted for in Section 4 of this Plan. Individual water management strategies are more particularly described in the urban water management plans prepared by the Agency contractors, other Agency customers, and Marin Municipal Water District. All of the water supplied by the Agency is sold wholesale to water retail agencies. The Agency does not maintain its own retail distribution system. Figure 2-1 depicts the Russian River watershed and the Agency's water supply system. This section describes the facilities that comprise the surface water supply system. The surface water supply quantities, supply constraints, and reliability are described in Section 4.



Source: SCWA Water Supply Staff Report, November 2004

BROWN AND CALDWELL	PROJECT 127280-005	SITE UWMP 2005, Sonoma County Water Agency	Figure 2-1
	DATE 10-27-06	TITLE Russian River Watershed	

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The Russian River watershed drains an area of 1,485 square miles that includes much of Sonoma and Mendocino counties. The headwaters of the Russian River are located in central Mendocino County, approximately 15 miles north of Ukiah. The Russian River is approximately 110 miles in length and flows generally southward to Mirabel Park, where it changes course and flows westward to the discharge point at the Pacific Ocean near Jenner, approximately 20 miles west of Santa Rosa.

Two federal projects impound the water supply diverted and delivered by the Agency through its transmission system: the Coyote Valley Dam on the Russian River east of the city of Ukiah in Mendocino County (forming Lake Mendocino), and the Warm Springs Dam on Dry Creek (a tributary of the Russian River) northwest of the City of Healdsburg in Sonoma County (forming Lake Sonoma). Because the Agency was the local sponsor for the dams and partially financed their construction, the Agency has the right to control releases from the water supply pools of both reservoirs. PG&E's PVP, discussed below, imports water from the Eel River into the Russian River watershed. Lake Sonoma and Lake Mendocino and their associated facilities, collectively referred to as the Russian River Project, are operated in accordance with criteria established by the SWRCB's Decision 1610, which established minimum instream flow requirements for Dry Creek and the Russian River. The Agency makes no diversions from the Russian River between Lake Mendocino and the Russian River's confluence with Dry Creek, but does authorize diversions by others (see Section 4.1.2, page 4-3) under its water rights permits. Flood management releases from both reservoirs are controlled by the United States Army Corps of Engineers (USACE). The Agency diverts water from the Russian River near Forestville and conveys the water via its transmission system (including diversion facilities, treatment facilities, pipelines, water storage tanks, and booster pump stations) to its wholesale customers.

2.3.1 Lake Pillsbury and the Potter Valley Project

The Pacific Gas & Electric Company (PG&E) PVP, originally constructed in 1908, includes a diversion tunnel to transfer Eel River water to the Russian River watershed. Water for the PVP is stored in Lake Pillsbury on the Eel River. Water from Lake Pillsbury (constructed for the PVP in 1922) is released to the Eel River. Some of this water is re-diverted 12 miles downstream at Cape Horn Dam to the Potter Valley Power Plant in the Russian River watershed through PG&E's diversion tunnel. The water then flows through the East Fork of the Russian River to Lake Mendocino. PVP diversions are regulated by a license issued to PG&E by FERC and serve multiple purposes, including power generation, Potter Valley agricultural irrigation, and summer flow augmentation in the middle and upper Russian River. Early fall releases of water stored in Lake Mendocino resulting from PVP diversions are also important to the fall migration of threatened Chinook salmon in the Russian River watershed.[1]

2.3.2 Lake Mendocino and Coyote Valley Dam

The Coyote Valley Dam impounds water, forming Lake Mendocino on the East Fork of the Russian River. Lake Mendocino has been an operating reservoir since 1959 and captures water from two sources: (1) runoff from a drainage area of approximately 105 square miles and (2) diverted Eel River water downstream of the PG&E generating station and not consumed by agricultural irrigation. Natural drainage and stream flow (as opposed to reservoir releases) contribute the majority of the Russian River flow downstream of Coyote Valley Dam and above Dry Creek during the rainy season (November through April). In contrast, during the drier months of May through October, water released from Lake Mendocino accounts for most of the water in the Russian River upstream of Dry Creek.

The Agency and the Mendocino County Russian River Flood Control and Water Conservation Improvement District have water right permits authorizing storage up to the design capacity of 122,500 acre-feet per year (ac-ft/yr) in the reservoir. The design water supply pool capacity of Lake

[1] See State Water Resources Control Board Water Right Order 2004-0035 at 8 (approving request by Agency to temporarily reduce flow in Russian River above Healdsburg to conserve water in Lake Mendocino for benefit of salmonid species in Russian River): "The proposed change will help conserve cold water in Lake Mendocino so that it can be released for listed Russian River salmonid fisheries present in the Russian River during the late summer and fall months. It is in the public interest to preserve water supplies for these beneficial uses when hydrologic circumstances intervene to cause dangerous reductions in these water supplies."

Mendocino is 72,000 ac-ft. The Agency controls releases from the water supply pool in Lake Mendocino. However, the USACE manages flood control releases when the water level exceeds the top of the water supply pool elevation. The USACE allows the Agency to encroach into the flood pool in the spring so that the summer water supply pool can be increased to 86,000 ac-ft.

2.3.3 Lake Sonoma and Warm Springs Dam

Water stored by Warm Springs Dam, completed in 1983, forms Lake Sonoma, which lies approximately 10 miles northwest of the City of Healdsburg on Dry Creek. Runoff from a drainage area of approximately 130 square miles contributes water to Lake Sonoma. Lake Sonoma has a design capacity of 381,000 ac-ft at the spillway crest and a design water supply pool capacity of 245,000 ac-ft. The Agency controls water supply releases from Lake Sonoma and the USACE manages flood control releases.

Natural drainage and stream flow (as opposed to reservoir releases) contribute the majority of the Dry Creek flow downstream of Warm Springs Dam during the rainy season (November through April). During the dry season (May through October), reservoir releases contribute the majority of the flow in Dry Creek. Such reservoir discharges supply flow to meet minimum instream flow requirements and municipal, domestic, and industrial demands in the lower Russian River area. Water from Lake Sonoma via reservoir releases and runoff from other tributaries contribute to meeting these demands (Sonoma County Water Agency, 2004a).

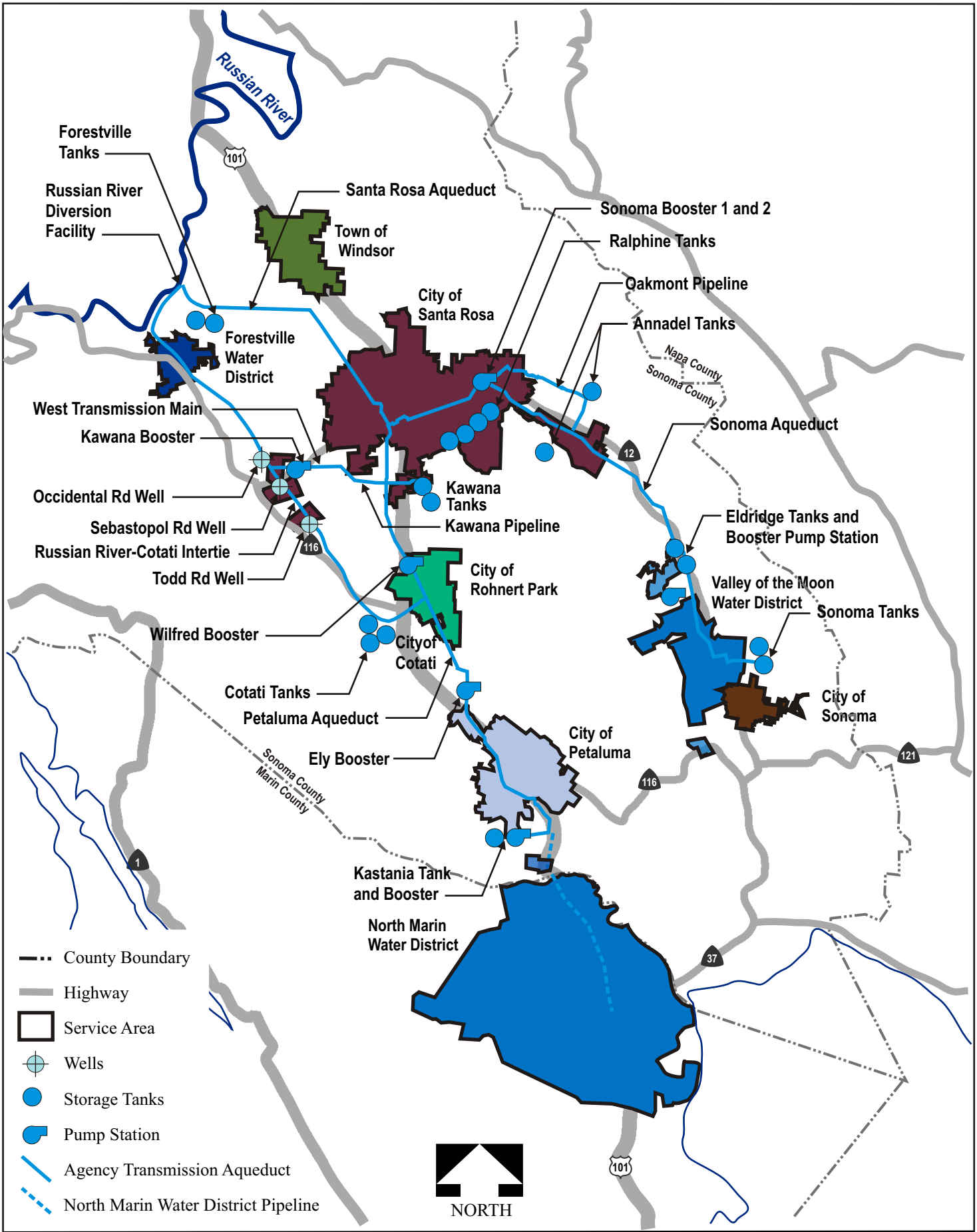
2.4 Groundwater Facilities

In addition to surface water, groundwater is an important source of water in Sonoma County (County) because it provides the domestic water supply for most of the unincorporated portion of the County, and is a primary source of water for agricultural uses. Groundwater, extracted from three wells located along the Russian River-Cotati Intertie Pipeline in the Santa Rosa plain, also provides a portion of the Agency's water supply. The locations of the wells are depicted on Figure 2-2. Some of the contractors and other Agency customers have their own local groundwater supplies. The groundwater supply characteristics, quantities, and constraints are described in Section 4.

2.5 Water Transmission System

Water is diverted from the Russian River and delivered to the Agency's contractors and other Agency customers through a transmission system. Figure 2-2 depicts the Agency's service areas and

the transmission system. The transmission system extends from the Agency's Russian River diversion facilities located near Forestville to the Santa Rosa, Petaluma, and Sonoma valleys. The transmission system consists of over 85 miles of pipelines that range in diameter from 12 to 54 inches, 7 booster pump stations, and 17 storage tanks with a combined storage capacity of 129 million gallons (Sonoma County Water Agency, 2004a). The major pipelines that comprise the system are known as the Santa Rosa Aqueduct (built in 1959), the Sonoma Aqueduct (built in 1963), the Petaluma Aqueduct (built in 1961), and the Russian River to Cotati Intertie (built in 1977). A pipeline owned and operated by the North Marin Water District receives water from the transmission system near the Kastania Tanks located near the border of Marin County with Sonoma County. The Agency's major storage systems are known as the Raphine, Sonoma, Cotati, and Kastania tanks.



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BROWN AND CALDWELL	PROJECT 127280-005	SITE UWMP 2005, Sonoma County Water Agency	Figure 2-2
	DATE 10-27-06	TITLE Agency Service Areas and Water Transmission System Facilities	

SECTION 3
PROJECTED WATER USE

This section presents information regarding regional demographics, and projections of future Agency water demands.

3.1 Employment, Land Use, and Population

This section describes employment and land use characteristics and current and future population estimates for the Agency's service area.

3.1.1 Employment Characteristics

Within the Agency's service area, employment is primarily in the public sector and in the service and manufacturing industries. Regionally, employment in the agricultural industry is associated with vineyards, livestock, orchards, silage crops, and timber. The primary industrial activities in the region include: telecommunications, wine production, timber and other agricultural product processing, gravel mining and processing, energy production, and miscellaneous manufacturing. Recreation and tourism are small but growing industries in the region (Sonoma County Water Agency, 2000a).

3.1.2 Land Use Characteristics

Land use within the Agency's service area is characterized as mostly suburban. Residential development is more densely concentrated in the cities of Santa Rosa, Rohnert Park, Petaluma, and Cotati, with Forestville, Sonoma, and Valley of the Moon having less concentrated development. In the north Marin County area, residential development is concentrated along Highway 101 and adjacent to San Pablo Bay.

Sonoma County, by policy, concentrates urban growth within incorporated cities, not in the unincorporated area. Sonoma County has a voter-approved County-wide urban growth boundary and each city has an urban growth boundary. There are voter-approved taxes supporting open space acquisition in all of Sonoma County and in northern Marin County. Most of the Agency's contractors have locally approved growth management ordinances.

3.1.3 Population Projections

Population and employment projections were developed for each of the Agency's contractors and the Agency's other customers, in consultation with those contractors and customers. The population and employment forecasts were generally based on the most recently applicable adopted or draft General Plan. In some instances, the forecasts are based on the projections developed in 2005 by the ABAG. Table 3-1 summarizes the basis of the population projections. The population projections are described in the analysis performed by Maddaus Water Management (Maddaus Water Management and Weber) and will be described in each water utility's individual urban water management plan. Table 3-2 provides current and projected populations through the year 2030 for the Agency's service area.

Table 3-1. Basis of Population Projections

Water Contractor or Other Agency Customer	Basis of Population Projection
Water Contractors	
City of Cotati	ABAG 2005
North Marin Water District	Draft Marin County-wide Plan, 2005[a]
City of Petaluma	City of Petaluma General Plan, 2005
City of Rohnert Park	City of Rohnert Park General Plan, 2002
City of Santa Rosa	Santa Rosa General Plan, 2002 and ABAG, 2005
City of Sonoma	City of Sonoma Draft General Plan
Valley of the Moon Water District	Draft Sonoma County General Plan
Town of Windsor	ABAG 2005
Other Customers	
California American Water Company	Draft Sonoma County General Plan
Forestville Water District	Draft Sonoma County General Plan
Kenwood	Draft Sonoma County General Plan
Lawndale	Draft Sonoma County General Plan
Penngrove	Draft Sonoma County General Plan

[a] Uses ABAG 2005 projections data.

Table 3-2. (DWR Table 2) Population – Current and Projected

Water Contractors	2005	2010	2015	2020	2025	2030
City of Cotati	7,105	7,453	7,800	8,100	8,400	8,500
North Marin Water District	58,816	60,674	64,072	66,271	67,569	68,669
City of Petaluma	57,277	64,000	69,000	70,390	74,000	74,000
City of Rohnert Park	41,640	43,764	45,997	48,343	49,740	49,740
City of Santa Rosa	153,790	165,535	176,627	187,067	197,507	206,294
City of Sonoma	10,733	12,348	12,642	12,740	12,838	12,984
Valley of the Moon Water District	22,665	23,359	24,055	24,753	25,109	25,466
Town of Windsor	22,909	25,409	26,409	27,809	28,809	31,339
Other Customers						
California American Water Company	8,295	8,562	8,829	9,096	9,228	9,370
Forestville Water District	2,166	2,266	2,367	2,467	2,558	2,649
Kenwood	999	1,031	1,062	1,094	1,115	1,132
Lawndale	312	331	350	369	415	432
Penngrove	1,655	2,238	2,559	2,977	3,185	3,385
Total	388,362	416,970	441,769	461,476	480,473	493,960

3.2 Water Use

The Agency provides water to eight water contractors, other Agency customers, and the Marin Municipal Water District. The Agency also has water supply agreements with several entities that directly divert from the Russian River under the Agency's water rights. The Agency distributes wholesale water to its contractors and other Agency customers, which then retail water directly to different water user categories, including single-family, multi-family, commercial, irrigation/agricultural, industrial, institutional/governmental, and landscape. Because the Agency does not deliver water to these end user categories, DWR Table 12 (which provides information about such deliveries) is not provided in this plan.

The Agency and contractors worked together to develop a water demand analysis and water demand projections. The detailed water demand analysis and demand projections are presented in the analysis performed by Maddaus Water Management (Maddaus Water Management and Weber) and will be described in the urban water management plans of each of the contractors and one other Agency customer (Forestville Water District). The water demand projection process consisted of projecting future demographics, evaluating historical water use characteristics, defining alternative levels of water conservation efforts, and developing resulting water demand projections. The

projections include consideration of the impacts of the plumbing code and current and future water conservation efforts.

The historical water use analysis generally consisted of evaluating the monthly water use per account for each customer category over a 5 to 10 year period. The analysis resulted in a weather normalized annual water use per account type, expressed as gallons per day per account. The demographic projections, water use characteristics, and alternative conservation efforts were integrated using the Decision Support System (DSS) model to develop resulting demand projections. The DSS model and the water conservation assumptions are described in Section 6.

Table 3-3 summarizes the projected total water use by the Agency's contractors and other customers. The projected water use incorporates the water savings from water conservation efforts and contractor and customer system losses. Table 3-4 summarizes projected wholesale water sales to Agency water contractors and other customers from 2010 to 2030. This Agency supply consists of Agency Russian River and groundwater supplies. Table 3-4 does not include contractor and customer local supplies consisting of recycled water and groundwater.

Table 3-3. (DWR Table 13 and 19) Total Water Use by Agency Contractors and Customers – ac-ft/yr[a]

	Volume (ac-ft/yr)				
Water Contractors	2010	2015	2020	2025	2030
City of Cotati	1,323	1,380	1,511	1,552	1,612
North Marin Water District	12,648	13,484	13,930	14,244	14,473
City of Petaluma	12,848	13,803	14,114	14,732	14,660
City of Rohnert Park[b]	7,116	7,380	7,662	7,767	7,831
City of Santa Rosa	27,884	29,456	30,957	32,633	33,820
City of Sonoma	2,783	2,817	2,806	2,813	3,071
Valley of the Moon Water District	3,748	3,751	3,787	3,798	3,817
Town of Windsor	5,075	5,550	6,120	6,354	6,523
Other Customers					
California American Water Company	1,326	1,368	1,409	1,429	1,451
Forestville Water District	552	563	575	588	602
Kenwood	175	181	186	190	193
Lawndale	66	70	74	83	86
Penngrove	400	457	532	569	604
Marin Municipal Water District[c]	6,915	6,790	11,300	12,800	14,300
Direct Diverters[c]	0	0	2,448	3,671	4,895
Total	82,859	87,050	97,411	103,223	107,939

[a] The 2030 water use is equal to the 2030 gross demand, less savings for conservation activities (plumbing code, CUWCC "Tier 1" BMPs, "Tier 2" BMPs, and new housing standards) as described in Section 6.2. The 2030 water use reflects demand in an average weather year; actual demand may vary from these estimates based on the weather year. Water conservation savings includes both additional water conservation to be achieved after June 2004, and reductions in demand resulting from the continuation of water conservation measures implemented by the Contractors as of June 2004. But for the embedded results of those existing conservation efforts, which are summarized in Appendix B, the 2030 gross demand grand total figure would be somewhat higher. Pursuant to the Restructured Agreement for Water Supply (see Section 4.1.2), the water contractors must implement the CUWCC BMPs for water conservation or alternative water conservation measures that secure at least the same level of water savings. The water contractors have also agreed to use their best efforts to secure the implementation of any water conservation measures required by the Agency's appropriative water rights permits or licenses or applicable law. Because the figures in this Table are projections, actual water use may vary over time from the estimates set forth in the table.

[b] Existing recycled water use, offsetting potable supply, was previously accounted for in Rohnert Park's net demand analysis.

[c] Value does not represent total water use, but only the volume supplied by the Agency.

Table 3-4. (DWR Table 13 and 19) Agency Sales to Agency Contractors and Customers – ac-ft/yr[a]

	Volume (ac-ft/yr)				
Water Contractors	2010	2015	2020	2025	2030
City of Cotati	1,168	1,171	1,339	1,425	1,489
North Marin Water District	11,189	11,482	12,385	13,107	13,000
City of Petaluma	11,368	11,753	12,556	13,561	13,400
City of Rohnert Park	6,301	6,292	6,817	7,152	7,491
City of Santa Rosa	24,706	25,127	27,543	30,032	30,930
City of Sonoma	2,459	2,393	2,491	2,586	3,000
Valley of the Moon Water District	3,312	3,185	3,360	3,488	3,729
Town of Windsor	4,480	4,701	5,417	5,827	5,750

Table 3-4. (DWR Table 13 and 19) Agency Sales to Agency Contractors and Customers – ac-ft/yr [a] (continued)

	Volume (ac-ft/yr)				
Other Customers					
California American Water Company	1,326	1,368	1,409	1,429	1,451
Forestville Water District	542	542	544	546	550
Kenwood	175	181	186	190	193
Lawndale	66	70	74	83	86
Penngrove	400	457	532	569	604
Marin Municipal Water District	6,915	6,790	11,300	12,800	14,300
Direct Diverters	0	0	2,448	3,671	4,895
Total	74,407	75,512	88,401	96,467	100,869

[a] Sales figures in this table represent the water use figures from Table 3-3 less savings due to an individual contractor's local water supply development (Local Supply and Recycled Water). Pursuant to the Restructured Agreement for Water Supply, the water contractors have also agreed to use their best efforts to secure the implementation of recycled water or local supply projects to reduce the water contractors' collective deliveries from the Transmission System. Because the figures in this table are projections, actual local water supply development amounts may vary over time from those estimated for purposes of the figures set forth in the table, as may the manner in which contractors achieve those local water supply amounts (i.e., projected savings and local supply/recycled water may vary).

Table 3-5 identifies and quantifies additional water uses.

Table 3-5. (DWR Table 14) Additional Water Uses and Losses, ac-ft/yr

Water Use	2010	2015	2020	2025	2030
Saline barriers	0	0	0	0	0
Groundwater recharge	0	0	0	0	0
Conjunctive use	0	0	0	0	0
Raw water	0	0	0	0	0
Recycled water	0	0	0	0	0
Unaccounted-for system losses[a]	3,104	3,341	3,635	3,845	4,000
Total	3,104	3,341	3,635	3,845	4,000

[a] Consists of unmetered uses, leaks, and meter inaccuracies.

The total amount of water projected to be distributed by the Agency is presented in Table 3-6 and is the sum of Tables 3-4 and 3-5. The Agency does not purchase water from other agencies.

Table 3-6. (DWR Table 15) Total Water Use, ac-ft/yr

Water Use	2010	2015	2020	2025	2030
Sum of Tables 3-4 and 3-5	77,511	78,853	92,036	100,312	104,869

SECTION 4
WATER SUPPLY

The Agency distributes Russian River water and groundwater to its water contractors and other Agency customers. Water from the Agency is distributed via its transmission system (as described in Section 2) and is used by Agency water contractors and other Agency customers to meet, in part, their water demands. This section describes the surface water and groundwater sources, quantities, supply constraints, and the reliability and water quality of the water supply sources. Recycled water is described in Section 5.

4.1 Surface Water

This section describes the physical constraints to the Agency's surface water supply and the legal background and constraints to this supply. As described in Section 2, the Agency receives its surface water from the Russian River.

4.1.1 Physical Constraints

The capacity of the Agency's transmission system is a physical constraint on the delivery of water to some of the Agency's contractors and other customers, particularly during high demand periods in the summer months. This physical constraint is addressed by the Memorandum of Understanding described in Section 4.1.2. Future water supply projections are dependent upon planned infrastructure improvements being approved and constructed, as discussed in Section 4.5.

4.1.2 Legal Constraints

The Agency's Russian River water supply is controlled and influenced by a variety of agreements and decisions. This section of the plan describes the water rights held by the Agency and the various agreements and issues that may influence the surface water supply.

Water Rights. Four SWRCB permits[2] currently authorize the Agency to store up to 122,500 ac-ft/yr of water in Lake Mendocino and up to 245,000 ac-ft/yr of water in Lake Sonoma, and to divert and redivert 180 cubic feet per second (cfs) of water from the Russian River at the Agency's Wohler and Mirabel facilities, up to 75,000 ac-ft/yr. The permits also establish minimum instream flow

[2] SWRCB Permits Numbers 12947A, 12949, 12950, and 16596.

requirements for fish and wildlife protection and recreation. These minimum instream flow requirements vary in normal, dry, and critically dry years as defined by SWRCB Decision 1610. The Agency meets the various instream flow requirements set by Decision 1610 by making releases from Coyote Valley Dam and Warm Springs Dam. The Agency has applied to the SWRCB to increase the Agency's Russian River diversion limit from 75,000 to 101,000 ac-ft/yr.

In the early 1990s, the Agency initiated a water project to increase the amount of water released from Lake Sonoma and diverted from the Russian River and to expand the transmission system. A challenge to the EIR for the water project was partially successful, and the Agency is in the process of preparing an EIR for a new water project. The new water project must undergo environmental review in accordance with the California Environmental Quality Act (CEQA) and obtain project approval before it can proceed. The Draft EIR is anticipated to be released for public review in 2007. Final EIR certification and project approval could be considered by the Board of Directors by June 2008.

Restructured Agreement for Water Supply. The *Restructured Agreement for Water Supply* (Restructured Agreement), which was executed in 2006, generally provides for the finance, construction, and operation of existing and new diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. The Restructured Agreement provides the contractual relationship between the Agency and its eight contractors, and includes specific maximum amounts of water that the Agency is obligated to supply to its water contractors. Maximum water allocations for each of the Agency's water contractors set forth within the Restructured Agreement were premised on the Agency's diversion/rediversion water rights being increased to 101,000 ac-ft/yr and on the construction of the new facilities authorized by the Restructured Agreement. Water allocations under the Restructured Agreement for each contractor, other Agency customers, and Marin Municipal Water District are presented in Table 4-1. Section 3.5 of the Restructured Agreement provides a method for allocating water among these parties during periods of shortage. The Agency has adopted a water shortage methodology, consistent with Section 3.5, which is presented in Appendix C.

Table 4-1 shows the maximum amount of water the Agency is obligated to deliver to its contractors, other Agency customers, and Marin Municipal Water District.

Table 4-1. Current Maximum Water Delivery Limitations for Agency Water Contractors and Customers

City/District	Restructured Agreement		Temporary Impairment MOU, Peak Month[a], mgd
	Annual, ac-ft/yr	Maximum Monthly, mgd	
City of Cotati	1,520	3.8	1.9
North Marin Water District	14,100	19.9	15.7
City of Petaluma	13,400	21.8	17.1
City of Rohnert Park	7,500	15.0	5.4
City of Santa Rosa	29,100	56.6	39.1
City of Sonoma	3,000	6.3	3.8
Valley of the Moon Water District	3,200	8.5	4.9
Town of Windsor	4,725/900[b]	7.2/1.5[b]	1.5
Other Agency Customers		2.7	1.7
Forestville Water District			0.9
Marin Municipal Water District[c]	14,300	12.8	

[a] During "summer months" of June through September.

[b] Windsor obtains a portion of its water supply from the Agency's transmission system and a portion through direct diversions from the Russian River (in part under the Agency's water rights) through Windsor's own diversion facilities. The figures in Table 4-1 for Windsor represent the maximum allocations for Windsor's direct diversions and Windsor's transmission system deliveries, respectively.

[c] The Agency's deliveries to Marin Municipal Water District are authorized by the Restructured Agreement and are subject to the terms of a Supplemental Water Supply Agreement, dated January 25th, 1996, between the Agency and the Marin Municipal Water District, which amended two existing agreements (the "Offpeak Water Supply Agreement" and the "Agreement for the Sale of Water"). Deliveries to Marin Municipal Water District under the Supplemental Water Supply Agreement are subject to a number of limitations, including sufficient transmission system capacity. The maximum monthly delivery limit for Marin Municipal Water District is 12.8 mgd during the months of May through October, which is a combination of the limits under the Agreement for the Sale of Water (9 mgd) and the Offpeak Water Supply Agreement (360 ac-ft/month). Marin Municipal Water Distrtict is not a party to the Temporary Impairment Memorandum of Understanding.

The Restructured Agreement also includes a maximum allocation for "other Agency customers," including the Forestville Water District, the County of Sonoma, California-American Water Company (Larkfield/Wikiup), Lawndale Mutual Water Company, Kenwood Village Water Company, Penngrove Water Company, the State of California, and Santa Rosa Junior College. The maximum allocation for the collective group of "other Agency customers" is 2.7 million gallons per day (mgd) in any month. While the entities considered "other Agency customers" are not individually limited at the present time, the Agency anticipates a renegotiation of "other Agency customer" agreements that will provide for individual maximum allocations (Sonoma County Water Agency, 2004a).

"Russian River Customer" agreements currently exist between the Agency and public entities that wish to divert water directly from the Russian River under Agency water rights. Such customers include the City of Healdsburg, the Town of Windsor, the Russian River County Water District, Camp Meeker Recreation and Park District, and the Occidental Community Services District. These

customers use their own diversion facilities to obtain Russian River water, and the Agency's agreements with these customers require them to use any water right they may have before using the Agency's water rights.

Memorandum of Understanding Regarding Water Transmission System Capacity Allocation during Temporary Impairment. The maximum delivery allocations in the Restructured Agreement assume the construction of certain additional facilities and approval by the SWRCB of increased Agency diversion from the Russian River up to 101,000 ac-ft/yr. Existing transmission system constraints have necessitated the development of an additional agreement to govern maximum water allocations during the summer months. The *Memorandum of Understanding Regarding Water Transmission System Capacity Allocation during Temporary Impairment* (Temporary Impairment MOU) is in effect between the Agency and its primary customers until September 30, 2008. The Temporary Impairment MOU allocates the existing 92 mgd of transmission system capacity among the parties during the "summer months" of June through September, as shown in Table 4-1. The Temporary Impairment MOU also contains mechanisms for enhancing operational coordination among the Agency's customers to balance demands on the Agency's transmission system during times of high water use.

Potter Valley Project License Proceedings. As noted in Section 2.3.1, PG&E's PVP diverts water from the Eel River into a powerhouse in Potter Valley to generate electricity, after which the water flows into the East Fork of the Russian River. Operation of the PVP is licensed by the FERC. PG&E's license to operate the PVP expires in 2022. PG&E's diversions from the Eel River watershed are subject to the terms of the FERC license.

On June 2, 2004, FERC issued its final order on an application filed by PG&E in 1998 to amend the FERC license to include an Eel River flow proposal that reduces the amount of water diverted into the Russian River watershed for the benefit of Eel River fisheries. The FERC order implemented a modified PVP flow regime based upon a Biological Opinion issued by the National Marine Fisheries Service as part of a consultation initiated by FERC under Section 7 of the federal ESA.

Endangered Species Act Consultation. Two salmonid species inhabiting the Russian River watershed (Chinook salmon and steelhead) have been listed as "threatened" under the federal ESA, and one species – Coho salmon – has been listed as "endangered" under the ESA and under the California ESA. Protective regulations promulgated under the ESA prohibit the "take" of these species. "Take" is broadly defined in the ESA and its implementing regulations; it includes not only

intentionally killing a protected species, but also actions that unintentionally result in actual harm to a member of a protected species, including adverse modification of habitat. Civil and criminal penalties may be imposed under the ESA for the "take" of protected species.

Because the Agency's water supply facilities and operations have the potential to adversely affect the three listed species, the Agency entered into a Memorandum of Understanding in December 1997 to participate in a consultation under Section 7 of the ESA. The other signatories to the MOU include the USACE (the federal agency) and the National Marine Fisheries Services (NMFS). Under Section 7 and the MOU, NMFS will issue a Biological Opinion that will evaluate the effects of Agency activities on the listed species. In connection with the Biological Opinion, NMFS may issue an incidental take statement that will immunize the Agency from liability under the ESA for authorized incidental takes. To obtain this immunity, NMFS may require the Agency to modify its water supply facilities or operations.

In connection with the Section 7 consultation, the Agency has prepared and transmitted to NMFS the Russian River Biological Assessment, dated September 29, 2004, which evaluated the impact of the Agency's operations on the listed species and proposed certain operational changes to reduce those impacts.[3] NMFS has informed the Agency that it is working toward issuing a Biological Opinion covering the Agency's existing operations in 2007. It is uncertain what modifications NMFS may ultimately require the Agency to implement in order to obtain an incidental take statement for future operations, including an increase in the Agency's Russian River diversions. However, given the analysis set forth in the Biological Assessment and the Agency's ongoing communications with NMFS' staff, it is reasonable to assume that with the implementation of mitigation measures, ESA constraints will not affect or impair the water supply available to the Agency for delivery to its transmission system customers.

4.2 Groundwater

This section presents a description of the Agency's groundwater supply, as well as the physical and legal constraints of this supply. The groundwater supply facilities are described in Section 2.

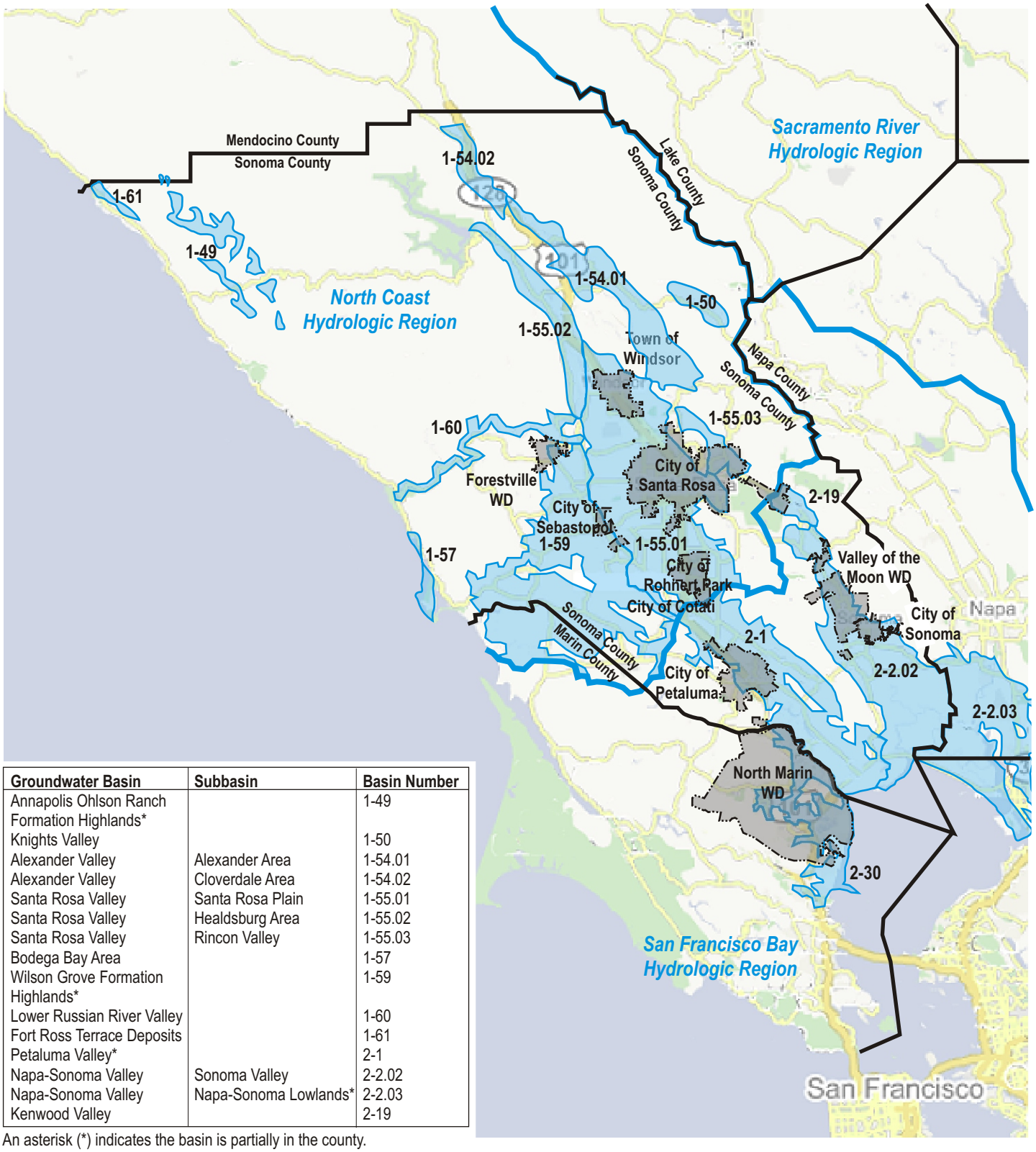
[3] The Biological Assessment is available at http://www.spn.usace.army.mil/ets/rrsection7/.

4.2.1 Description

There are four main groundwater basins in Sonoma County: Sonoma Valley (a subbasin of the Napa-Sonoma Valley Basin (DWR number 2-2), Alexander Valley (DWR number 1-54), Santa Rosa Valley (DWR number 1-55), and Petaluma Valley (DWR number 2-1). These basins and the other less significant basins in the County are shown in Figure 4-1. The basin descriptions are summarized from Bulletin 118 – Update 2003 and on-line more detailed Bulletin 118 basin descriptions (DWR, 2003). The Agency has groundwater wells only in the Santa Rosa Plain Subbasin of the Santa Rosa Valley Basin (3 supply wells as shown on Figure 2-3). Several of the Agency's contractors have their own local groundwater supplies in the Santa Rosa Plain, Sonoma Valley and Petaluma Valley groundwater basins. DWR has not identified overdraft conditions in any of these groundwater basins.

4.2.2 Alexander and Sonoma Valley Basin Studies and Groundwater Management Activities

Groundwater basin studies are being conducted within Sonoma County by the Agency and the USGS and other stakeholders in the Alexander Valley Basin, Sonoma Valley Basin, and the Santa Rosa Plain Subbasin. In 2001, the Agency's Board of Directors authorized the Agency to enter into an agreement with the USGS to develop a cooperative study to characterize the Sonoma and Alexander Valley basins. Within the Sonoma Valley, both the Valley of the Moon Water District and the City of Sonoma served as cooperating agencies for the study, providing data and input throughout the study period. The first basin studies, including the Sonoma Valley and Alexander Valley, have recently been completed (USGS, 2006a and b). The cooperative studies, summarized below, are designed to improve understanding of the groundwater resources and facilitate improved groundwater management strategies. As part of these studies, the USGS evaluated geology, water levels, water quality, surface water and groundwater interactions, and recharge areas. In addition, a groundwater model was developed for the Sonoma Valley to assist in identifying problem areas within the basin and to simulate future groundwater conditions under various potential scenarios.



Groundwater Basin	Subbasin	Basin Number
Annapolis Ohlson Ranch Formation Highlands*		1-49
Knights Valley		1-50
Alexander Valley	Alexander Area	1-54.01
Alexander Valley	Cloverdale Area	1-54.02
Santa Rosa Valley	Santa Rosa Plain	1-55.01
Santa Rosa Valley	Healdsburg Area	1-55.02
Santa Rosa Valley	Rincon Valley	1-55.03
Bodega Bay Area		1-57
Wilson Grove Formation Highlands*		1-59
Lower Russian River Valley		1-60
Fort Ross Terrace Deposits		1-61
Petaluma Valley*		2-1
Napa-Sonoma Valley	Sonoma Valley	2-2.02
Napa-Sonoma Valley	Napa-Sonoma Lowlands*	2-2.03
Kenwood Valley		2-19

An asterisk (*) indicates the basin is partially in the county.

NORTH

0 5 10

Scale in Miles

Source: Google Map data 2005 NAVTEC™
DWR Bulletin 118, 2003 Update

County Line and Name

System Boundary and Name

Hydrologic Region Boundary

Groundwater Basin and Number

BROWN AND CALDWELL

PROJECT	SITE	Figure
127280-005	UWMP 2005, Sonoma County Water Agency	4-1
DATE	TITLE	
7-31-06	Groundwater Basins	

P:\27000\127280 - Sonoma County Water Agency\UWMPs\SonomaCWA\figures

Alexander Valley Groundwater Basin. The Alexander Valley Subbasin includes the Alexander Area Subbasin (1-54.01) and the Cloverdale Area Subbasin (1-54.02). The previously mentioned USGS study of the geohydrology and water chemistry of the Alexander Valley was recently completed to provide an improved scientific basis for addressing emerging water-management issues, including potential increases in water demand and potential changes in flows in the Russian River to improve conditions for listed fish species under the State and Federal ESA. The USGS study tasks included (1) evaluation of existing geohydrological, geophysical, and geochemical data; (2) collection and analysis of new geohydrologic data, including subsurface lithologic data, ground-water levels, and streamflow records; and (3) collection and analysis of new water-chemistry data. The estimated total groundwater use for the Alexander Valley for 1999 was approximately 15,800 acre-feet. About 13,500 ac-ft of this amount was for agricultural use, primarily vineyards, and about 2,300 ac-ft was for municipal/industrial use. Groundwater is the main source of water supply for this area (USGS, 2006b). The Agency has no water supply wells in the Alexander Valley.

Sonoma Valley Groundwater Subbasin. The Sonoma Valley Groundwater Subbasin (2-2.02) is a subbasin of the Napa-Sonoma Valley Groundwater Basin. The basin drains southeast and is thus part of the San Francisco Bay Hydrologic Region (DWR, 2003). The USGS recently completed its evaluation of the geology, water levels, water quality, surface water and groundwater interactions, and recharge areas of the Sonoma Valley Subbasin. In addition, a groundwater model was developed for the Sonoma Valley to assist in identifying problem areas within the basin (USGS, 2006a). In general, the Sonoma Valley Groundwater Subbasin appears to be limited in the amount of water it can store, given the predominately fine-grained materials that comprise the basin. In Sonoma Valley, the USGS estimated that pumping in the basin has generally increased from approximately 6,200 ac-ft/yr, since the basin was last studied in 1974, to 8,400 ac-ft/yr in 2000 (approximate 25 percent increase in pumping). The USGS noted significant increase in pumping since 2000 that should be evaluated. Although the USGS concluded that groundwater quality is generally acceptable within the basin, there were some localized problems identified in the basin. The USGS also identified lowered groundwater well levels in some areas of the basin. In addition, the USGS identified the migration of high-saline water along the southern end of the basin and, in some locations, the USGS identified areas of thermal water that can leach out metals and other undesirable constituents into the water (USGS, 2006a). The Agency has no water supply wells in the Sonoma Valley.

Based on the Agency/USGS groundwater study results, the Agency funded a stakeholder assessment conducted by the Center of Collaborative Policy, a non-profit organization associated with the McGeorge Law School and Sacramento State University to evaluate interest in developing a groundwater management plan. The Agency also developed a work plan for a groundwater management plan that would comply with AB3030 and SB1938 guidelines. In June 2006, the Agency's Board of Directors authorized the Agency to initiate a groundwater management planning process in the Sonoma Valley to help ensure the long-term sustainability of the basin's groundwater resources. In addition, the Board of Directors approved concurrent actions authorizing execution of a Cooperative Agreement to Provide Funding and Support Information for Sonoma Valley Groundwater Management Planning Process between the Agency, County of Sonoma, Sonoma Valley County Sanitation District, Valley of the Moon Water District, and City of Sonoma. Also, the Board authorized a Memorandum of Understanding to Work Cooperatively to Improve Surface and Groundwater Management and to Promote Conjunctive Use Projects and Programs in Sonoma County between Sonoma County Water Agency, County of Sonoma, and DWR.

4.2.3 Santa Rosa Plain Subbasin Studies and Groundwater Management Activities

Santa Rosa Plain Subbasin of the Santa Rosa Groundwater Basin. The Santa Rosa Plain is a subbasin (DWR number 1-55.01) of the Santa Rosa Valley Basin, which also includes the Healdsburg Area Subbasin (1-55.02) and Rincon Valley Subbasin (1-55.03) (DWR, 2003). The Santa Rosa Plain drains northwest toward the Russian River, and is thus part of the North Coast Hydrologic Region. South of Rohnert Park is a drainage divide marked by several small hills that separate the Santa Rosa Valley Basin from the Petaluma Valley Groundwater Basin (2-1), which drains to the southeast toward the San Francisco Bay and is thus part of the San Francisco Bay Hydrologic Region (DWR, 2003).

The Santa Rosa Plain Subbasin is the largest basin in the County and underlies the most populated areas of the County. In December 2005, the USGS and the Agency began a five-year comprehensive basin study similar to the studies that have been completed for the Alexander and Sonoma Valleys. This $1.975 million study is being funded by the Agency, City of Santa Rosa, City of Cotati, City of Rohnert Park, City of Sebastopol, Town of Windsor, County of Sonoma, the California American Water Company, and the USGS.

The objectives of the study are to: 1) develop an updated assessment of the geohydrology and geochemistry of the Santa Rosa Plain; 2) develop a multi-aquifer ground-water flow model for the Santa Rosa Plain; and 3) evaluate the hydrologic impacts of alternative ground-water management strategies for the basin. The study will provide hydrologic information that will assist the Agency, municipalities in the Santa Rosa Plain, and other management and regulatory agencies in better understanding the potential impacts of any increasing ground-water use on ground-water levels, stream-aquifer interaction, subsidence, and water quality. The study will consider several priority USGS water-resource issues including surface- and ground-water interactions, effects of urbanization on water resources, and hydrologic-system management. The approach of the study will include: (1) data compilation, utilizing a Geographic Information System (GIS); (2) new data collection, focusing on water-quality sampling; (3) data interpretation and geohydrologic characterization, including refining hydrologic budgets and updating conceptual models of the ground-water flow system based on the new data and the results of ongoing USGS geologic studies in the basin; and (4) simulation of ground-water flow in Santa Rosa Plain.

The Santa Rosa Plain Subbasin is cut by many northwest-trending faults that influence groundwater flow. Most of the groundwater is unconfined, but in some locations can be confined where folding and faulting exists (DWR, 2003). The water-bearing deposits underlying the basin include the Wilson Grove Formation and two other units (the Glen Ellen Formation and a younger and older alluvium) with lower water-bearing capacities (DWR, 2003). The Wilson Grove Formation is the major water-bearing unit in the basin and ranges in thickness from 300 feet to 1,500 feet (Winzler and Kelly, 2005; DWR, 2003). Deposited during the Pliocene, it is a marine deposit of fine sand and sandstone with thin interbeds of clay, silty-clay and some lenses of gravel. Interbedded and interfingered with the Wilson Grove Formation are Sonoma Volcanic sediments separating the water-bearing units. Aquifer continuity and water quality are generally good according to Cardwell, 1958, which is still the most detailed reference on the hydrogeology.

The Glen Ellen Formation overlies the Wilson Grove Formation in most places and is Pliocene to Pleistocene in age (DWR, 2003). At some locations, the two formations are continuous and form the principal water body in the basin (Cardwell, 1958). The Glen Ellen consists of partially cemented beds and lenses of poorly sorted gravel, sand, silt, and clay that vary widely in thickness and extent (Cardwell, 1958; DWR, 1982). The formation is used for domestic supply and some irrigation (DWR, 2003).

The Pliocene Petaluma Formation is exposed at various localities in Sonoma County, from Sears Point northward nearly to Santa Rosa. The formation consists of folded continental and brackish water deposits of clay, shale, sandstone, with lesser amounts of conglomerate and nodular limestone and occasional thick beds of diatomite are present. The Petaluma Formation has been defined as being contemporaneous in part and interfingering with the Merced Formation. The Petaluma Formation is noted for its low well yields.

Quaternary deposits include stream-deposited alluvium, alluvial fan deposits, and basin deposits (Todd Engineering, 2004). The younger alluvium (Late Pleistocene to Holocene age) overlies the older alluvium (Late Pleistocene age). The alluvium deposits consist of poorly sorted sand and gravel and moderately sorted silt, fine sand, and clay. The upper and mid-portion of the alluvial fan deposits are on the eastern side of the Santa Rosa Plain and are permeable and provide recharge to the basin. The basin deposits overlie the alluvial fan materials and have a lower permeability (Todd Engineering, 2004; Cardwell, 1958). Wells in the alluvium do not have significant productivity (DWR, 2003).

A 1982 DWR study concluded that groundwater levels in the northeast part of the Santa Rosa Plain Subbasin had increased, while groundwater levels in the south had decreased (DWR, 1982). Groundwater storage capacity in the Santa Rosa Plain is estimated by the USGS to be 948,000 ac-ft (Cardwell, 1958).

Natural recharge occurs east of Santa Rosa, primarily along stream beds, at the heads of alluvial fan areas, and in some parts of the Sonoma Volcanics. For the Santa Rosa Plain Subbasin, average annual natural recharge from 1960 to 1975 was estimated to be 29,300 ac-ft and average annual pumping during the same time was estimated at 29,700 ac-ft. Well yields range from 100 to 1,500 gpm (DWR, 2003).

In development of the Plan, Brown and Caldwell reviewed the Rohnert Park General Plan (GP) and Revised Draft Environmental Impact Report (DEIR) (Dyett and Bhatia, 2000), both of which cite a City of Rohnert Park Groundwater Study prepared by PES Environmental, Inc. (PES) in May 2000. The groundwater modeling study reportedly found the potential for short-term water level impacts during the period 2000 to 2009, depending on recharge rates. The GP states that policies have been developed to ensure that groundwater levels are not substantially lowered.

Brown and Caldwell also reviewed the Rohnert Park City-Wide Water Supply Assessment (WSA) (Winzler and Kelly Consulting Engineers and Luhdorff and Scalmanini Consulting Engineers, 2005), which includes an analysis of the numerical groundwater flow modeling performed by PES for the GP and DEIR. The WSA found significant limitations in the PES modeling efforts; specifically the model:

- Simulated the aquifer system as a single unconfined layer
- Underestimated groundwater recharge from precipitation in the modeled area
- Did not include the eastern portion of the WSA study area where a significant portion of the recharge occurs
- Did not include groundwater inflow from the hills east of Rohnert Park
- May not have included other sources of recharge such as infiltration from the streamflow, irrigation returns, or septic systems

The WSA found that as a result of these limitations the PES model did not accurately simulate groundwater levels during the 1990s, and showed continued groundwater level declines rather than the stable water levels that were actually observed in wells. More comprehensive recharge analysis for the WSA and by Todd (2004) indicated significantly higher recharge rates and a positive change in groundwater storage in the 1990s (an absence of overdraft) that is more consistent with the actual stable to slightly increasing groundwater level trends (Winzler and Kelly Consulting Engineers and Luhdorff and Scalmanini Consulting Engineers, 2005).

According to the WSA (Luhdorff and Scalmanini Consulting Engineers and Winzler and Kelly Consulting Engineers, 2005), wells in the shallow aquifer (0 to 200 feet) in the Santa Rosa Plain Subbasin in the WSA study area near Rohnert Park have generally exhibited stable long-term groundwater level trends from 1975 to the present. In the depth zone where the City of Rohnert Park has production wells (200 to 600 feet), groundwater elevations have responded more to pumping than to hydrologic changes. Groundwater levels were generally stable from 1977 to 1981, declined from 1982 to 1990 when pumping increased, and gradually rose from 1990 to 1997 when total pumping in the area (including Rohnert Park, Cotati, Sonoma State University, and private, commercial, and agricultural users) decreased to an average of 8,700 ac-ft/yr for the WSA study area because of an increased use of Agency water (Winzler and Kelly Consulting Engineers and Luhdorff

and Scalmanini Consulting Engineers, 2005). From 1997 to 2003, water levels were stable and, by 2003, when total pumping in the WSA study area decreased to 7,100 ac-ft/yr, groundwater levels recovered significantly. The WSA concludes that although groundwater levels decreased from 1982 to 1990 in the southern Santa Rosa Plain, the subsequent recovery indicates there were no overdraft conditions (Winzler and Kelly Consulting Engineers and Luhdorff and Scalmanini Consulting Engineers, 2005). According to the WSA, there is also no indication of an overdraft condition elsewhere in the subbasin. In 2003, the City of Rohnert Park made a shift to obtain water primarily from the Agency. This shift resulted in an increase in groundwater levels in the vicinity of the City of Rohnert Park's wells. The WSA found that a projected 2025 City pumpage of 7,350 afy would be within the range of historically sustainable pumpage (Winzler and Kelly Consulting Engineers and Luhdorff and Scalmanini Consulting Engineers, 2005).

A groundwater study for the Canon Manor West Subdivision Assessment District (a residential neighborhood immediately southeast of Rohnert Park) was prepared for the County of Sonoma in 2004 (Todd Engineers, 2004). The County study generally found water level trends similar to those described in the WSA. The County study found that groundwater levels had declined over an extensive portion of the southern Santa Rosa Plain between 1950 and the late 1980s, and that declines in the 1970s and 1980s correlated with ramping up of municipal groundwater pumpage. Since 1987, groundwater levels generally stabilized and even increased in some wells, indicating a new equilibrium between recharge and pumpage. The study further found that although the Canon Manor potential impact is small relative to existing uses, future development of groundwater in the Rohnert Park area has a reasonable potential of increasing and thus could induce future groundwater declines (Todd Engineers, 2004).

The use of recycled water in the Santa Rosa subbasin offsets demand for potential potable use by agricultural operations. Recycled water use in the Santa Rosa subbasin has decreased somewhat over the years due to increased emphasis on irrigation efficiency and crop conversion to vineyards which have lower water requirements. The Santa Rosa Subregional Reclamation System provides recycled water for agricultural users and will continue to meet the needs of the current agricultural customers.[4]

[4] Personal communication with Jennifer Burke, City of Santa Rosa, Oct. 27, 2006.

The Agency's three groundwater supply wells are located in the Santa Rosa Plain north, east, and southeast of Sebastopol. The Agency conducts a groundwater monitoring program of water levels in seventeen dedicated monitoring wells near its water supply wells to assess the effects of these wells on groundwater conditions. According to Agency records, continuous operations of the Todd, Sebastopol, and Occidental Road water supply wells began in April 1999, June 2001, and July 2003, respectively. Brown and Caldwell reviewed monitoring data from 2001 to early 2006 for the 17 wells for the purposes of this Plan. In general, the data document normal seasonal fluctuations and temporary declines in water levels in response to pumping for wells in close proximity to the water supply wells.

As expected, monitoring wells located in close proximity and screened at similar depths to the Occidental and Sebastopol Road water supply wells reflect water levels of the water supply wells and are stable over time. Shallow monitoring wells in close proximity to these water supply wells generally exhibit seasonal variations and have stabilized since pumping began.

Water levels in monitoring wells within a few hundred feet of the Occidental Road supply well (perforated zones from 313 to 753 feet below ground surface [bgs]) indicate: (1) declines in 2003 when pumping began on the order of 30 to 40 feet in deep monitoring wells (830 feet bgs) that have since stabilized, and (2) decline in water levels of 15 to 20 feet in shallow monitoring wells (less than 100 feet deep) that have also generally stabilized. Water levels in monitoring wells within a few hundred feet of the Sebastopol Road supply well (perforated zones from 410 to 1,020 feet bgs) indicate: (1) initial water level declines since pumping began in 2001 in deeper monitoring wells that have since stabilized on the order of 50 to 60 feet, (2) water level declines since 2001 of 15 to 20 feet in intermediate (between 170 and 194 feet bgs) monitoring wells which have since stabilized, and (3) no apparent water level declines in shallow (less than 100 feet bgs) monitoring wells. In general, water levels in the Sebastopol Road well area had stabilized by early 2006 in response to Agency pumping, which began in 2001 and increased in mid-2003. Water levels in three monitoring wells with depths of 80, 257, and 570 feet bgs that are located approximately 300 feet from the Todd Road supply well (with perforated zones from 650 to 800 feet bgs) indicate water levels have risen slightly since monitoring began in early 2004.

Agency monitoring data since late 2002 from three wells located between 0.5 and 1.5 miles from the Sebastopol and Occidental Road water supply wells show no significant response to the increased Agency pumping, indicating that impacts, if any, are limited. In addition, the DWR groundwater website (http://wdl.water.ca.gov/gw) has water level data for several wells in the Santa Rosa Plain near Highway 116 north of Sebastopol and near Highway 12 between Sebastopol and Santa Rosa. All of these wells show stable water levels from 1990 to 2006, and there is thus no indication of long-term overdraft in the Santa Rosa Plain subbasin.

In summary, although the Santa Rosa Plan USGS/Agency will provide updated data and new tools that may affect ground-water management strategies for the basin, existing studies and data regarding groundwater level trends over time do not indicate any long-term overdraft in the Santa Rosa Plain subbasin or any basis to conclude that there is a physical constraint on the groundwater supply other than the limited capacity of the Agency's pumping facilities.

4.2.4 Physical Constraints

The current groundwater supply is constrained by the pumping capacity of the existing Agency wells, which is 7.6 mgd (Sonoma County Water Agency, 2000a). The quantity of groundwater projected to be pumped by the Agency's contractors is presented in Section 4.5.

The groundwater quantities pumped by the Agency in the last five years are shown on Table 4-2, while the Agency's projected future production through 2030 is shown in Table 4-3. Although the Agency pumped 4,613 ac-ft in 2004, the Agency has used a figure of 3,870 ac-ft for future pumping. Even though the wells can be reliability operated at higher pumping rates, this is conservative and allows periodic servicing of the wells.

Table 4-2. (DWR Table 6) Amount of Groundwater Pumped by the Agency – ac-ft/yr

Basin Name (s)	2000	2001	2002	2003	2004	2005
Santa Rosa Plain	2,363	2,961	3,592	4,701	4,585	5,906
% of Total Water Supply	3	4	5	7	7	9

Source: Sonoma County Water Agency, 2004b

Table 4-3. (DWR Table 7) Amount of Groundwater Projected to be Pumped by the Agency - ac-ft/yr

Basin Name(s)	2010	2015	2020	2025	2030
Santa Rosa Plain	3,870	3,870	3,870	3,870	3,870
% of Total Water Supply	5	5	4	4	4

Source: Sonoma County Water Agency, 2000a

4.2.5 Legal Constraints

There are no existing legal constraints on the Agency's ability to use its groundwater supply. The Agency's pumping rights are shown in Table 4-4.

Table 4-4. (DWR Table 5) Agency Groundwater Pumping Rights – ac-ft/yr

Basin Name	Pumping Right – ac-ft/yr
Santa Rosa Plain (1-55.01)	Not limited
Total	Not limited

Source: DWR, 2003.

4.3 Desalination

Desalinated water is not currently a viable option for Agency water supply, as the ocean is not immediately adjacent to the Agency's facilities and the Agency's wells produce neither brackish nor impaired groundwater.

Though the Agency is not pursuing desalination as a potential water supply, some of its water contractors or customers may explore the option in the future. The Marin Municipal Water District has constructed a pilot-scale desalination plant (the Seawater Desalination Pilot Plant). If a full-scale desalination plant were constructed, it is possible that the neighboring North Marin Water District could supplement its water supply with desalinated water. However, because the potential of a full-scale desalination plant is unknown, no desalinated water supply is projected for this Plan.

The City of Sonoma, Valley of the Moon Water District, and the City of Petaluma could potentially desalinate brackish groundwater. These possibilities are speculative at this time.

4.4 Transfer and Exchange Opportunities

Currently, the Agency does not transfer and/or exchange water with other entities, and it is not anticipated that transfers or exchanges will occur in the future. Water transfers between the Agency's water contractors and other Agency customers have been necessary in the past and may be necessary in the future to improve water reliability. The Restructured Agreement authorizes water transfers between water contractors in certain limited circumstances (Sonoma County Water Agency, 2000a).

4.5 Russian River System Model

The projections of the future water supply quantities available to the Agency, which are presented in Section 4.6, are based on the results of operations modeling of the Russian River. This section describes the modeling effort. The Russian River System Model (RRSyM) is an operations modeling system for the Russian River developed and periodically updated by the Agency. The model, which performs a water balance routing through the Russian River system, is used as a planning tool to simulate the effects of various levels of demand and operational criteria. RRSyM consists of three models which are run sequentially, each model providing input for the next, to simulate the inflows into Lake Mendocino, the releases from and storage levels in Lakes Mendocino and Sonoma, and the streamflows at specific nodes throughout the length of Dry Creek and the Russian River mainstem.[5] The models are programmed with 95 years of hydrologic data (1909 - 2004), represented as daily unimpaired tributary flows into the Russian River and Dry Creek. The hydrologic data was obtained from the USGS, USACE, and other sources. Unimpaired flows are the "natural" flows, unaffected by man-made influences, such as water demands, or reservoir operations. These tributary flows are aggregated by reach and do not correspond to any specific tributary. These unimpaired flows form the basis of the hydrology in the models. Also programmed into the models are minimum instream flow requirements, and distributed demands. Represented by these demands are not only the Agency's diversions, but all the diversions and depletions in the watershed, whether or not the diversions and depletions are legally permitted. Thus, the model assumes that all demands in the watershed are satisfied with its simulated flow releases, not just demands of the Agency.

[5] The RRSyM was first developed in 1988 and has been continuously updated and improved. The model was recently peer reviewed and improved as a result of its use in the Potter Valley Project license amendment proceedings at the Federal Energy Regulatory Commission.

RRSyM is normally used to simulate the effects of various demand levels and operational criteria using the same set of urban and agricultural demands for the entire simulation period. This method offers a rational basis for comparing the effects of one set of demands with another, and aids in understanding the range of impacts that might be expected. Thus, comparisons of streamflow and storage levels between corresponding time periods from two simulations can be very useful in understanding the expected effects of changes in demands or operational criteria.

To determine the water available at the Agency's water transmission system intakes, RRSyM was used to simulate different hydrologic periods as specified in California Water Code Section 10631(c). These periods were selected from the historical hydrologic record to best represent an average year, a single dry year, and multiple dry years. To represent an average year, 1962 was selected. 1962 was slightly drier than average and was preceded by two similar years. To represent a single dry year, year 1977 was selected. 1977 is the single driest year of record. To represent multiple dry years, 1990 through 1993 were selected. While this is not the driest four-year period of record (1929-1932 and 1930-1933 were slightly drier), it is the driest four-year period of record under which the current minimum instream flow requirements were in effect.

Previous modeling studies carried out by the California Department of Water Resources divided the Russian River watershed into eight hydrologic subunits. The Santa Rosa subunit is the southernmost subunit within the watershed and its boundaries circle around the Town of Windsor to the north, Sebastopol to the west Cotati to the south, and east to the Sonoma/Napa County line. The annual water demands within the Santa Rosa sub-unit include 9,620 ac-ft/year of urban demand diverted directly by urban water purveyors, 910 ac-ft by other direct diverters, and 7,560 ac-ft/year for agricultural demand. Diversions by urban water purveyors are made pursuant to water rights held by the purveyors or under contracts with the Agency that allow such diversions under the Agency's appropriative water rights permits. The purveyors include the Town of Windsor, City of Healdsburg, Russian River County Water District, Occidental Community Service District, and Camp Meeker Recreation and Park District. Other direct diverters are small water companies and individual direct diverters, which divert from the Russian River under their own water rights. The total annual diversion limit under the contracts between the Agency and these four public agencies is

9,620 ac-ft[6]. The agricultural demands include 2,210 ac-ft of main stem demands that occur during the summer irrigation season and 5,350 ac-ft of tributary demands that consist of diversions to storage that occur principally during the winter. Irrigation demand during the summer increases to 3,310 ac-ft during dry years. Consistent with the assumptions stated above regarding water rights and appropriation, the balance of the water demand within the Santa Rosa sub-unit is water delivered by the Agency's water transmission system.

The Agency's appropriative water rights permits include a provision that requires the Agency to impose a thirty percent deficiency in deliveries from the Russian River to its service area under certain prescribed hydrologic conditions. This deficiency must remain in effect unless "hydrologic conditions result in sufficient flow to satisfy permittee's demands at Wohler and Mirabel Park and minimum flow requirements in the Russian River at Guerneville." This provision is intended to ensure the maintenance of minimum stream flows required by Decision 1610. This provision is accounted for in the modeling, and affects the Santa Rosa subunit urban demand during such periods.

Ongoing sedimentation of Lake Pillsbury, Lake Mendocino and Lake Sonoma will result in a gradual small reduction in the water supply available to the Agency's water transmission system. These sedimentation rates have been estimated and modeled and are accounted for in the RRSyM. Thus, the total storage available under the future scenarios is slightly less than under the current scenarios.

4.5.1 Model Study Results

The quantification of the Russian River water supply available to the Agency's water transmission system consists of using the estimated annual urban water demand within the Santa Rosa hydrologic sub-unit for 2010 to 2030 and simulating the hydrologic periods of interest to determine the water remaining in storage in Lake Sonoma. The minimum pool of Lake Sonoma is 13,000 ac-ft plus an allocated share of the sediment reserve, estimated to be an additional 7,000 ac-ft, for a total of 20,000 ac-ft. The total Santa Rosa sub-unit demand that can be satisfied includes the portion of the annual demand representing agriculture (7,560 ac-ft), the other urban public water purveyors

[6] Because these demands are not supplied by the Agency's transmission system and the purveyors are not water contractors, except for Town of Windsor, (as defined in this document), they are not included in this UWMP 2005. It is assumed that the purveyors will complete their own UWMP, as necessary. The 9,620 ac-ft represents the maximum future diversions under these contracts; current diversion are well below this amount.

(10,530 ac-ft), and other direct diverters. Thus, all demands in the watershed are assumed to be accounted for under the scenarios simulated. The modeled future Agency demands are presented in Table 4-5.

Table 4-5. Future Agency Demands Modeled

Scenario Year	Demand ac-ft
2010	73,642
2015	74,983
2020	85,717
2025	96,574
2030	101,000

Average Year. For the average year (1962) the hydrologic model simulations are presented in Table 4-6. In Table 4-6 through 4-8, the "Lake Storage" figure is the minimum storage in Lake Sonoma produced by the model under the given hydrological year(s), and the "Date" is the hypothetical date upon which the minimum storage occurs.

Table 4-6. Average Year Minimum Lake Storage (1962)

Scenario Year	Lake Storage ac-ft	Date of Minimum Lake Elv.
2010	206,028	10/10/1962
2015	205,741	10/10/1962
2020	202,559	10/10/1962
2025	197,958	10/10/1962
2030	196,560	10/10/1962

Note: Minimum lake storage remaining after demands are met.

Single Dry Year. For the single dry year (1977) the hydrologic model simulations are presented in Table 4-7.

Table 4-7. Single Dry Year Minimum Lake Storage (1977)

Scenario Year	Lake Storage ac-ft	Date of Minimum Lake Elv.
2010	75,083	11/20/1977
2015	70,587	11/20/1977
2020[a]	58,773	11/20/1977
2025[a]	48,933	11/20/1977
2030[a]	50,483	11/20/1977

Note: Minimum lake storage remaining after demands are met.
[a] Reduction of demands will be required during a portion of the year.

Multiple Dry Years. For the multiple dry years (1990-1993) the hydrologic model simulations are presented in Table 4-8.

Table 4-8. Multiple Dry Years Minimum Lake Storage (1990 – 93)

Scenario Year	Lake Storage ac-ft	Date of Minimum Lake Elv.
2010	132,893	2/25/1991
2015	131,596	2/25/1991
2020	121,510	2/25/1991
2025	100,236	2/25/1991
2030	94,038	2/25/1991

Note: Minimum lake storage remaining after demands are met.

4.6 Current and Projected Water Supplies

This section provides projections of the future water supply quantities available to the Agency. Future water supply projections are dependent upon planned infrastructure improvements being approved and constructed as under the new planned Water Project. The start and completion dates and the anticipated water supply from the Water Project are summarized in Table 4-9. The key elements and milestones of future water supply projects are presented in Table 4-10.

Table 4-9. (DWR Table 17) Future Water Supply Projects

Project Name	Projected Start Date	Projected Completion Date	Normal year ac-ft to agency	Single-dry year yield ac-ft	Multiple Dry Year		
					Year 1 ac-ft	Year 2 ac-ft	Year 3 ac-ft
Water Supply, Transmission, and Reliability Project[1] and other projects	2008	2020	26,000	10,520	26,000	26,000	26,000

Note:
[1]In compliance with CEQA, the Notice of Preparation to prepare an Environmental Impact Report for this project was released in February 2005.

Table 4-10. Water Project Elements and Milestones

Element	Completion Date[a]
Water Project EIR	
Draft EIR	June 2007
Final EIR	May 2008
EIR Certification/Project Approval	June 2008
Transmission System Facilities	
Kawana Tank No. 2	2006
Kawana-Ralphine Pipeline	2010
Cotati-Kastania Pipeline	2012
Annadel-Sonoma Pipeline	2015
Mirabel-Cotati Pipeline	2017
South Transmission System Tanks	2036
Diversion Facilities	2020
Water Conservation	ongoing
Water Project Water Right Permits	
State Water Resource Control Board Approval	2016

[a] Completion dates are times to meet demand

Table 4-11 summarizes the current and projected water supplies available to the Agency, excluding local groundwater, recycled water, and surface water supplies used by some of the Agency's contractors and other customers. The Agency does not produce recycled water, except as described in Section 5-2. Some of the Agency's water contractors and other Agency customers produce or are supplied recycled water by other entities. Recycled water is described in further detail in Section 5.

Table 4-11. (DWR Table 4) Current and Planned Water Supplies for the Agency – ac-ft/yr

Water Supply Sources	2010	2015	2020	2025	2030
Wholesale provider	0	0	0	0	0
Agency produced groundwater	3,870	3,870	3,870	3,870	3,870
Agency surface diversions	75,000	75,000	101,000	101,000	101,000
Transfers in or out	0	0	0	0	0
Exchanges in or out	0	0	0	0	0
Recycled water (projected use)	0	0	0	0	0
Desalination	0	0	0	0	0
Other	0	0	0	0	0
Total	78,870	78,870	104,870	104,870	104,870

Table 3-4 summarizes the projected amounts of Agency's groundwater and Russian River water anticipated to be delivered to the Agency's water contractors, other Agency customers, and Marin Municipal Water District.

Tables 4-12 and 4-13 summarize the projected amount of local groundwater and local recycled water (respectively) that the Agency's water contractors and other Agency customers advise the Agency they anticipate having from 2005 through 2030. As presented in Table 4-12, the projected volume of groundwater and other local supply usage decreases once the Agency's water project is implemented.

Table 4-12. Projected Groundwater or Other Local Supply Usage by Sonoma County Water Agency Contractors and Other Agency Customers - ac-ft/yr

	Volume (ac-ft/yr)				
	2010	2015	2020	2025	2030
Water Contractors[a]	7,633	9,865	6,503	3,414	2,887
Other Customers[b]	0	0	0	0	0
Total	7,633	9,865	6,503	3,414	2,887

[a] North Marin Water District's local supply includes local surface water. Groundwater is the only local supply for the other customers, other than recycled water as presented in Table 4-13

[b] Assumed to be zero for this Plan and because these small municipals may have to rely predominately on Agency water.

Table 4-13. Projected Recycled Water Usage by the Sonoma County Water Agency Contractors and Other Agency Customers - ac-ft/yr

	Volume (ac-ft/yr)				
	2010	2015	2020	2025	2030
Water Contractors	808	1,652	2,476	3,301	4,131
Other Customers	10	21	31	42	52
Total	818	1,673	2,507	3,343	4,183

Note: Existing recycled water use, offsetting potable supply, was previously accounted for in Rohnert Park's net demand analysis.

4.7 Water Supply Reliability

This section describes the projected supplies available during single- and multiple-dry water years. During short-term periods of water supply reductions, the Agency would implement its water shortage contingency plan, which is presented in Appendix C.

The Agency's surface water supply is subject to reductions during dry years. When the Lake Sonoma water volume is less than 100,000 ac-ft during single-dry years, a 30 percent reduction of diversions is required, as dictated by the SWRCB water-rights Decision 1610. The Agency's groundwater supply capacity is assumed to not be impacted by single-dry years given the short duration and low frequency of occurrence.

The reliability of the Agency's two water supply sources (Russian River surface water and groundwater) for single- and multiple-dry water years is summarized in Table 4-14.

Table 4-14. (DWR Table 8) Year 2030 Supply Reliability for the Agency - Percent of Normal ac-ft/yr

Sources	Normal Water Year	Single-Dry Year	Multiple-Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
Agency-diverted Russian River	101,000	85,520	101,000	101,000	101,000	101,000
Agency produced groundwater	3,870	3,870	3,870	3,870	3,870	3,870
Transfers in or out	0	0	0	0	0	0
Agency recycled water	0	0	0	0	0	0
Total	104,870	89,390	104,870	104,870	104,870	104,870
Percent of Normal	100%	85%	100%	100%	100%	100%

Table 4-15 lists the years upon which the data in Table 4-14 are based.

Table 4-15. (DWR Table 9) Basis of Water Year Data for Agency Supply Reliability

Water Year Type	Base Year(s)
Normal Water Year	1962
Single-Dry Water Year	1977
Multiple-Dry Water Years	1990 - 1993

Table 4-16 includes the anticipated water supplies for the Agency and its water contractors, other Agency customers, and Marin Municipal Water District during single- and multiple-dry water years. The basis for the information in Table 4-16 is provided in Table 4-15.

Table 4-16. (Modified DWR Table 8) Year 2030 Supply Reliability for the Agency and its Water Contractors and Other Agency Customers - Percent of Normal ac-ft/yr

Sources	Normal Water Year	Single-Dry Year	Multiple-Dry Water Years			
			Year 1	Year 2	Year 3	Year 4
Agency-diverted Russian River	101,000	85,520	101,000	101,000	101,000	101,000
Agency produced groundwater	3,870	3,870	3,870	3,870	3,870	3,870
Contractors and other customers local groundwater supply	2,887	2,887	2,887	2,887	2,887	2,887
Contractors and other customers recycled water	4,183	4,183	4,183	4,183	4,183	4,183
Transfers in or out	0	0	0	0	0	0
Agency recycled water	0	0	0	0	0	0
Total	111,940	96,460	111,940	111,940	111,940	111,940
Percent of Normal	100%	86%	100%	100%	100%	100%

Note: Existing recycled use, offsetting potable supply, was previously accounted for in Rohnert Park's net demand analysis.

Factors resulting in inconsistency of the Agency's supply are summarized in Table 4-17. Water quality issues are not anticipated to have significant impact on water supply reliability. If applicable in the future, chemical contamination and the lowering of maximum contaminant levels (MCLs) for

naturally occurring constituents can be mitigated by constructing new treatment facilities. These treatment facilities could have a significant cost.

Table 4-17. (DWR Table 10) Description of the Factors Resulting in Inconsistency of Supply

Name of supply	Legal	Environmental	Water Quality	Climatic
Russian River	Current supply is available at a consistent level of use with regard to these factors. Future supply increase may not be consistent due to delays in construction, in approval of water rights application, or in environmental documentation[a]		None	Drought could result in a reduction of surface water supply
Groundwater	None	None	None	None
Recycled water	None	None	None	None

[a] Section 1.6 describes the assumptions regarding the consistency of the supply. The Agency has no plans to replace the source with alternative sources. Local groundwater and recycled water supplies and water conservation are important additional sources for the Agency's customers.

The Agency's water supply is not currently supplemented by another wholesaler. The Agency has provided necessary wholesaler information for use in the contractors' and other Agency customers' urban water management plans.

4.8 Water Quality Impacts on Future Water Supply

The quality of the Agency's water deliveries is regulated by the California Department of Health Services (DHS), which requires regular collection and testing of water samples to ensure that the quality meets Federal and state regulatory standards and does not exceed MCLs. The Agency performs water quality testing, which has consistently yielded results within the acceptable regulatory limits.

The Agency treats its water supplies by chlorination for residual disinfection. The Agency also adds sodium hydroxide for pH adjustment to prevent copper plumbing corrosion. The Agency's water is of high quality, which is due to the natural filtration process utilized by the Agency's diversion facilities.

The quality of the Agency's surface water and groundwater supply sources over the next 25 years is expected to be adequate. Surface and groundwater will continue to be treated to meet drinking water standards and no impacts to water supplies due to water quality deficiencies are foreseen to

occur in the next 25 years. Table 4-18 summarizes the current and projected water supply changes due to water quality.

Table 4-18. (DWR Table 39) Current and Projected Water Supply Changes due to Water Quality - Percentage

Water Source	2005	2010	2015	2020	2025	2030
Sonoma County Water Agency	0	0	0	0	0	0
Groundwater	0	0	0	0	0	0
Recycled water	0	0	0	0	0	0
Total	0	0	0	0	0	0

SECTION 5
RECYCLED WATER

Water recycling is the treatment and management of municipal, industrial, or agricultural wastewater to produce water that can be reused for beneficial uses and offset demands for potable water supplies. Water recycling provides an additional source of water that can be used for purposes such as irrigation, groundwater recharge, industrial uses, and environmental restoration. "Recycled water" is defined in the California Water Code as "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur." DHS sets the water quality criteria for specific uses of recycled water in Title 22 of the California Code of Regulations.

This section provides information on the amount of generated wastewater, existing disposal of wastewater, the quantity of recycled water potentially available, and existing and future potential uses for recycled water. The Agency does not supply recycled water to its contractors or other Agency customers, but is involved with coordinating recycled water programs including funding for projects that offset Agency water deliveries. This section describes the recycled water amounts and uses by these entities.

5.1 Coordination

The use of recycled water reduces peak demands on the Agency's water supply system and the need to construct additional water storage facilities. Some of the Agency's contractors and other customers have developed recycled water plans in coordination with the wastewater treatment facilities within their local service areas. The Agency works with a number of local authorities responsible for water supply and wastewater collection and distribution. Table 5-1 identifies the authorities with whom the Agency coordinates to continually optimize the use of recycled water to offset demands on the potable water supply system.

Table 5-1. (DWR Table 32) Participating Agencies

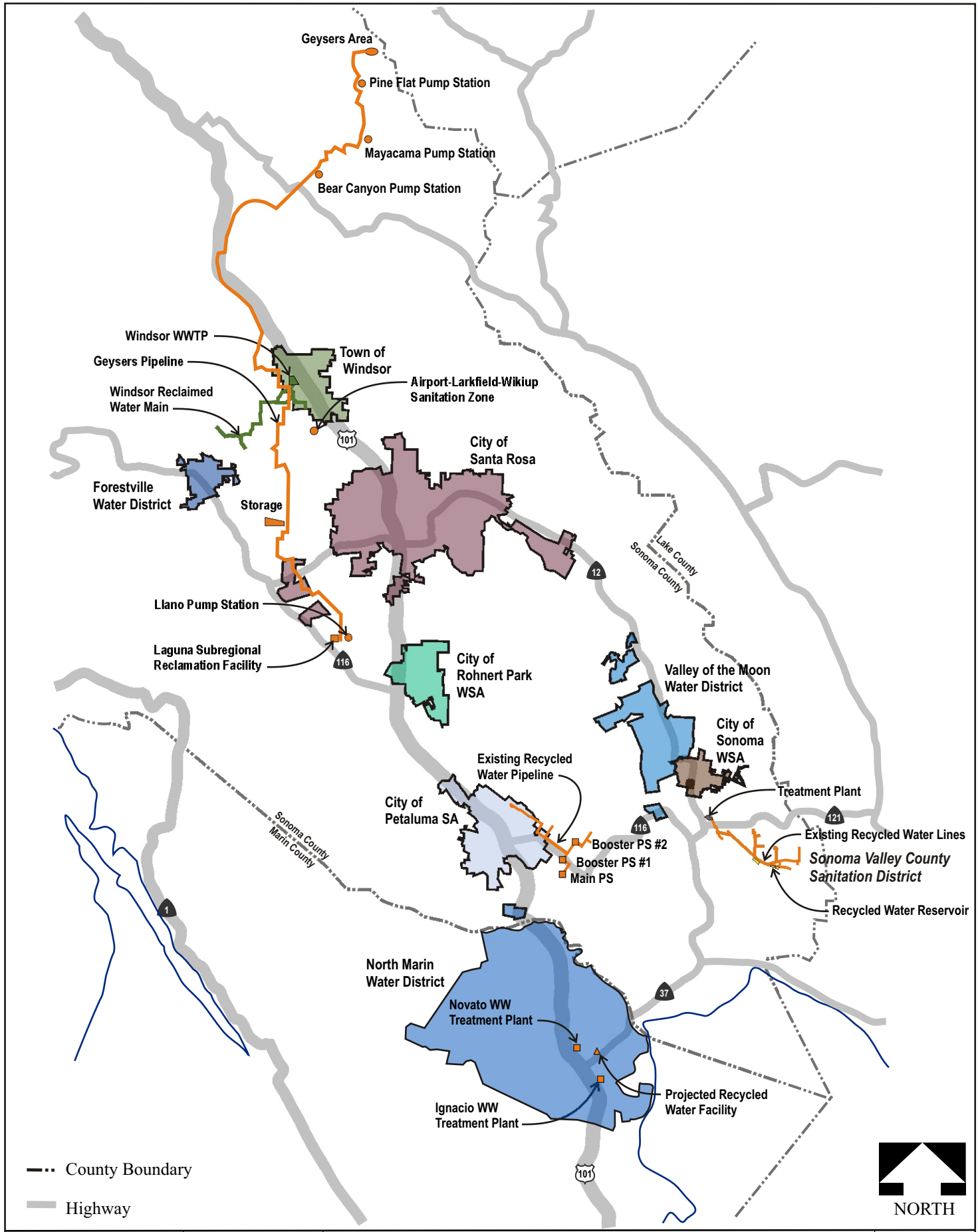
Agency Type	Agency Name	Plan Development Role
Local Water Supplier	City of Cotati	Provided recycled water supply and demand information
Local Water Supplier	City of Rohnert Park	Provided recycled water supply and demand information
Local Water Supplier	City of Santa Rosa	Provided recycled water supply and demand information
Local Water Supplier	City of Petaluma	Provided recycled water supply and demand information
Local Water Supplier	City of Sonoma	Provided recycled water supply and demand information
Local Water Supplier	Town of Windsor	Provided recycled water supply and demand information
Local Water Supplier	Forestville Water District	Provided recycled water supply and demand information
Local Water Supplier	North Marin Water District	Provided recycled water supply and demand information
Local Water Supplier	Valley of the Moon Water District	Provided recycled water supply and demand information
Wastewater Agency	Forestville Water District	Provided recycled water supply and demand information
Wastewater Agency	Novato Sanitary District	Provided recycled water supply and demand information
Wastewater Agency	City of Petaluma (Wastewater Treatment Facility)	Provided recycled water supply and demand information
Wastewater Agency	Santa Rosa Subregional Reclamation Facility	Provided recycled water supply and demand information
Wastewater Agency	Sonoma Valley County Sanitation District	Provided recycled water supply and demand information
Wastewater Agency	Town of Windsor Water Reclamation Division	Provided recycled water supply and demand information

5.2 Wastewater Quantity and Disposal

This section provides information on the amount of wastewater collected and treated within the Agency's service area.

5.2.1 Wastewater Collection and Treatment

Wastewater collection, treatment, and disposal within the Agency service area is the responsibility of six main wastewater treatment plants owned by: Forestville Water District, Novato Sanitary District, City of Petaluma (Petaluma Wastewater Treatment Facility), Santa Rosa Subregional Reclamation System (Subregional System), Sonoma Valley County Sanitation District, and the Town of Windsor Water Reclamation Division. The Subregional System exports some of its treated wastewater to the Geysers Recharge Project. The wastewater facilities owned by the Sonoma Valley County Sanitation District are operated and maintained under contract by the Agency. The Agency also operates other wastewater treatment facilities in the region. Figure 5-1 illustrates the location of the wastewater treatment facilities and reclamation facilities in the Agency's service area. Table 5-2 presents a summary of the wastewater treatment agencies within the area.



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BROWN AND CALDWELL	PROJECT 127280-005	SITE UWMP 2005, Sonoma County Water Agency	Figure 5-1
	DATE 10-27-06	TITLE Wastewater and Recycled Water Facilities	

Table 5-2. Wastewater Treatment within the Agency's Service Area

Wastewater System or Treatment Plant	Operator	Wastewater Source (water supply)
Airport-Larkfield-Wikiup Sanitation Zone	Sonoma County Water Agency	Agency water and local groundwater.
Forestville Water District	Forestville Water District	Agency water.
Novato Sanitary District Wastewater Treatment Plant	Novato Sanitary District	Serves portion of North Marin Water District. Blend of Agency water and local surface water.
Petaluma Wastewater Treatment Facility[a]	City of Petaluma	Agency water and local groundwater.
Santa Rosa Subregional Reclamation System[b]	City of Santa Rosa	Serves Cities of Santa Rosa, Cotati, Sebastopol, and Rohnert Park. Blend of Agency water and local groundwater.
Sonoma Valley County Sanitation District	Sonoma County Water Agency	Serves Valley of the Moon Water District and City of Sonoma. Blend of Agency water and local groundwater.
Windsor Water Reclamation Plant	Town of Windsor	Blend of Agency water, local surface water, and local groundwater.

[a] Penngrove wastewater is conveyed to Petaluma.
[b] Receives wastewater from South Park County Sanitation District.

The approximate amounts of wastewater collected and treated and the amount that meets recycled water standards for the five primary wastewater treatment facilities are described in Tables 5-3 and 5-4, respectively.

Table 5-3. (DWR Table 33) Amount of Wastewater Collected and Treated by each Agency – ac-ft/yr

Wastewater System	2000	2005	2010	2015	2020	2025	2030
Airport-Larkfield-Wikiup Sanitation Zone	900	1,250	1,330	1,410	1,490	1,560	1,650
Forestville Water District	140	144	148	152	156	160	164
Novato Sanitary District	7,270	7,570	7,860	8,150	8,440	8,730	8,730
Petaluma Wastewater Treatment Facility[a]	5,200	6,000	6,300	6,600	6,900	7,200	7,500
Santa Rosa Subregional Reclamation System[b]	19,600	22,393	26,074	28,988	31,902	--	--
Sonoma Valley County Sanitation District[c]	4,500	4,500	4,750	5,000	5,250	5,500	5,550
Town of Windsor Reclamation Division[d]	2,090	2,418	2,218	2,588	2,834	3,081	3,327

[a] Penngrove wastewater is conveyed to Petaluma.
[b] Provided by City of Santa Rosa. 2025 and 2030 projections not available. Includes wastewater from the subregional partners which include the Cities of Santa Rosa, Sebastopol, Cotati, Rohnert Park, Sonoma State University, and the South Park County Sanitation District.
[c] Includes wastewater from both Valley of the Moon Water District and City of Sonoma.
[d]. Values for 2000 and 2005 are actual wastewater flow totals for those years. Values for years 2010 through 2030 equal the water estimated ADWF plus I/I as a percent of ADWF. Source: December 2001. Water Reclamation MP, Figure 2-2 and from Storage Curve Master, I/I Percent of ADWF for a dry year.

Table 5-4. (DWR Table 33) Amount of Wastewater that Meets Recycled Water Standards – ac-ft/yr

Wastewater System	2000	2005	2010	2015	2020	2025	2030
Airport-Larkfield-Wikiup Sanitation Zone	900	1,250	1,330	1,410	1,490	1,560	1,650
Forestville Water District	0	144	148	152	156	160	164
Novato Sanitary District	2,360	2,400	2,710	3,080	3,450	3,850	4,170
Petaluma Wastewater Treatment Facility[a]	2,400	2,400	2,600	2,800	2,900	3,000	3,100
Santa Rosa Subregional Wastewater Reclamation System[b]	19,600	22,393	26,074	28,988	31,902	--	--
Sonoma Valley County Sanitation District[c]	0	0	4,750	5,000	5,250	5,500	5,550
Town of Windsor Reclamation Division[d]	2,090	2,418	2,218	2,588	2,834	3,081	3,327

[a] Penngrove wastewater is conveyed to Petaluma.
[b] Provided by the City of Santa Rosa. 2025 and 2030 projections not available.
[c] Includes wastewater from both Valley of the Moon Water District and City of Sonoma.
[d] Values for 2000 and 2005 are actual wastewater flow totals for those years. Values for years 2010 through 2030 equal the water estimated ADWF plus I/I as a percent of ADWF. Source: December 2001. Water Reclamation MP, Figure 2-2 and from Storage Curve Master, I/I Percent of ADWF for a dry year.

5.2.2 Wastewater Disposal

Within the Agency's service area, discharge of treated wastewater is regulated by the North Coast Regional Water Quality Control Board and the San Francisco Bay Regional Water Quality Control Board depending on the point of discharge. For each of the wastewater treatment facilities, Table 5-5 outlines the point of discharge, the level of treatment, and the amount of current and projected wastewater disposal (non-recycled). In general, the majority of the wastewater generated and treated during the summer months that is not delivered to Geysers Recharge Project by the Subregional System is used for alternative beneficial uses such as wetland habitat and restoration and irrigation for agriculture, pastures, vineyards, and golf courses. The use of the recycled water helps supply part of the potable water demand during the peak summer months.

Table 5-5. (DWR Table 34) Disposal of Wastewater (Non-Recycled) ac-ft/yr

Wastewater System	Location of Disposal	Treatment Level	2005	2010	2015	2020	2025	2030
Airport-Larkfield-Wikiup Sanitation Zone	Not applicable. ALWSZ is a zero discharge facility.	Tertiary	0	0	0	0	0	0
Forestville Water District[b]	Jones Creek	Tertiary	74	4	12	16	20	24
Novato Sanitary District[e]	San Pablo Bay	Secondary	4,910	5,150	5,340	5,530	5,720	5,655
Petaluma Wastewater Treatment Facility[d]	Petaluma River	Secondary	3,600	1,700	1,200	0	0	0
		Tertiary	0	2,000	2,600	4,000	4,200	4,400
Santa Rosa Subregional Reclamation System[a]	Russian River	Tertiary	3,681	7,362	7,362	7,362	--	--
Sonoma Valley County Sanitation District[c]	Schell Slough	Secondary	3,330	0	0	0	0	0
		Tertiary	0	3,250	1,250	950	600	150
Windsor Water Reclamation Plant [f]	Mark West Creek	Tertiary	563	563	563	563	563	563

Notes: Wastewater disposal volumes are weather dependent; dry years will produce less volume while wet years will produce higher volumes. An average year is shown in this table.

[a] Provided by the City of Santa Rosa.

[b] Forestville Water District is permitted to discharge into Jones Creek only from November to May; June through October water is used for agricultural irrigation.

[c] Sonoma Valley County Sanitation District only discharges to Schell Slough from mid-fall to mid-spring and during the remaining months the water is used for wetland enhancement and irrigation of pastures and vineyards.

[d] Petaluma does not discharge into the Petaluma River from May to October; therefore, the water is used for irrigation of golf courses and agricultural land. Penngrove wastewater conveyed to Petaluma.

[e] Novato Sanitary District is permitted to discharge into San Pablo Bay only during the winter months; during other months the District maintains the water in storage ponds for wildlife and irrigation.

[f] The Town of Windsor Reclamation Division is permitted to discharge into Mark West Creek only from October 1 through May 15, and cannot exceed one percent of the creek's flow.

5.3 Recycled Water Use

Projections for the recycled water use for 2005 were not made in the 2000 Urban Water Management Plan. Therefore, a comparison to projections for 2005 and actual use cannot be made. Table 5-6 shows actual recycled water use in 2005 for urban purpose that offsets potable water use. Since the Agency does not supply recycled water to offset potable water uses, the focus of this section is to summarize the recycled water use by the contractors and other customers. The projected uses by type of use are not presented in this Plan since the Agency does not supply recycled water (DWR Table 35a, 35b, 36, and 37). This specific information is presented in each contractor's own urban water management plan.

Table 5-6. (DWR Table 37) Recycled Water Uses - ac-ft/yr

Water Contractor/Customer	2005 Actual Use
Airport-Larkfield-Wikiup Sanitation Zone	0
Forestville Water District	20
North Marin Water District	0
City of Petaluma	190
City of Rohnert Park	1,135
City of Santa Rosa	344
City of Sonoma	0
Valley of the Moon Water District	0
Town of Windsor	372
Other Agency Customers[a]	0

Notes:
Only urban use that offsets potable water us is presented.
No projections were made in the 2000 Urban Water Management Plan.
[a] Excluding the Forestville Water District.

Some of the Agency's contractors and other customers have developed recycled water system master plans and programs. Current programs include using reclaimed water for irrigation of agricultural areas, parks, commercial properties, golf courses and vineyards to offset potable and nonpotable water demands.

Table 4-13 presents the projected recycled water use by the Agency's water contractors and other customers that would offset potable water use.

5.4 Promotion of Recycled Water Use

The Agency and its contractors encourage recycled water use by collecting, as part of Agency water rates, funds to be held in a special reserve for recycled water projects carried out by its water contractors and other Agency customers. A total of $4,187,464 has been disbursed between the program's inception on July 1, 2000 and June 30, 2005. It is anticipated another $8,812,536 will be disbursed in the next five years of program operation. DWR Table 38 is not included since the Agency does not directly supply recycled water.

SECTION 6
WATER CONSERVATION

This section provides a description of the Agency's water conservation program and its best management practices (BMPs) or water demand management measures. The Agency utilizes water conservation BMPs as a method to reduce water demands, thereby reducing the water supply needed to supply its customers. This section also describes the water conservation assumptions used to develop the water demand projections that are presented in Section 3.

6.1 BMP Implementation

The Agency is a member of the California Urban Water Conservation Council (CUWCC). The CUWCC was created to assist in increasing water conservation statewide, under a Memorandum of Understanding (MOU). As signatory to the MOU, the Agency has pledged its good faith effort towards implementing BMPs identified in the CUWCC MOU Regarding Urban Water Conservation. The two primary purposes of the MOU are as follows:

a. to expedite implementation of reasonable water conservation measures in urban areas, and

b. to establish assumptions for use in calculating estimates of reliable future water conservation savings resulting from proven and reasonable conservation measures. Estimates of reliable savings are the water conservation savings that can be achieved with a high degree of confidence in a given service area.

The Agency is the first wholesale water agency in the state to have all its water contractors sign the CUWCC MOU. The Agency signed the CUWCC MOU on June 1, 1998, and submits annual BMP reports to the CUWCC in accordance with the MOU. The MOU requires that a water utility implement only the BMPs that are economically feasible. If a BMP is not economically feasible, the utility may request an economic exemption for that BMP. The Agency has not requested an economic exemption from any BMP at this time.

The Agency implements all of the wholesale BMPs and some retail BMPs on behalf of some of the customers. Table 6-1 lists the CUWCC's 14 BMPs and identifies which retail and wholesale BMPs are being implemented by the Agency.

Table 6-1. California Urban Water Conservation Council Best Management Practices

Best Management Practices, BMP		Agency Retail BMPs	Agency Wholesale BMPs
BMP 01:	Water Survey Programs for Single-Family and Multi-Family Residential Customers	[a]	NA
BMP 02:	Residential Plumbing Retrofit	[a]	NA
BMP 03:	System Water Audits, Leak Detection, and Repair		✓
BMP 04:	Metering with Commodity Rates for all New Connections and Retrofit of Existing		NA
BMP 05:	Large Landscape Conservation Programs and Incentives	[a]	NA
BMP 06:	High-Efficiency Washing Machine Rebate Programs	[a]	NA
BMP 07:	Public Education Programs	[a]	✓
BMP 08:	School Education Programs	[a]	✓
BMP 09:	Conservation Programs for Commercial, Industrial, and Institutional Accounts	[a]	NA
BMP 10:	Wholesale Agency Assistance Programs	NA	✓
BMP 11:	Conservation Pricing		✓
BMP 12:	Conservation Coordinator	[a]	✓
BMP 13:	Water Waste Prohibition		NA
BMP 14:	Residential ULFT Replacement Programs	[b]	NA

Notes:
[a] These programs are being run in part by Sonoma County Water Agency.
[b] Sonoma Valley County Sanitation District operates a program in the Valley of the Moon Water District and City of Sonoma service areas.
NA = Not applicable

Urban water suppliers that are members of the CUWCC may submit their most recent BMP Annual Report for reporting years 2003-04 to meet the requirements of DWR Water Code Section 10631 (f). DWR also recommends that urban water suppliers include the Coverage Reports identifying the water supplier's progress on meeting the coverage requirement for quantifiable BMPs. The Agency's annual BMP Reports, Coverage Reports, Base Year Data, and Water Supply and Reuse data can be found in Appendix B. The Water Shortage Contingency Plan can be found in Appendix C.

6.2 Water Conservation Assumptions and Modeling

The water demand projections presented in Section 3 were developed based on certain assumptions regarding the future implementation of water conservation measures or BMPs. The Agency's contractors and other customers have previously committed to implementing all of the CUWCC BMPs. The CUWCC BMPs are currently in various stages of completion. Several of the contractors have conducted conservation activities that exceed the CUWCC BMP requirements. Water conservation measures that are not part of the CUWCC BMPs are also assumed to be implemented for this analysis. The Agency identified these measures as Tier 2 BMPs. New development standards that focus on low water using requirements for new single family housing

are also assumed. These assumed future water conservation activities were integrated with the current water use characteristics and the population growth projections using the DSS model. The analysis projects the future water demands based on four levels of increasing conservation effort: (1) current unit water use and the projected water savings from future plumbing retrofits as required by the plumbing code, (2) Tier 1 BMP efforts to date and remaining Tier 1 BMP efforts, (3) future Tier 2 BMP efforts, and (4) adoption of new development standards. The water demand projections presented in Section 3 assume that approximately half of the water savings from Tier 2 BMPs and 100 percent of savings from the new development standards would occur. The water contractors will use their best effort to implement these additional water conservation measures. Existing water conservation savings due to past implementation efforts are included in the baseline projection. Table 6-2 presents the Tier 2 BMPs.

The BMP modeling analysis and demand projections were performed using the CUWCC approved DSS model, a Microsoft® Office spreadsheet based program run from Windows XP. The DSS model has been used elsewhere in northern California, including a recent project for the San Francisco Public Utilities Commission. The DSS model has been designed to provide a detailed planning evaluation framework for water demand management programs. The DSS model performs a cost-effectiveness evaluation of each BMP using the data on market potential for each conservation measure and the assumptions for each conservation measure variable. The DSS analysis projects on an annual basis the water savings and the dollar values of the benefits and costs that would result from implementing the BMPs. The DSS model components consist of the following steps:

1. Establish customer base-year water use conditions by customer-billing category and then by end use.
2. Establish service area conditions for evaluation of conservation measures by creating a database of service area data relevant to the conservation measures to be evaluated.
3. Conduct model calibration to current water use conditions by end use fixture models.
4. Use the service area data to perform a benefit and cost evaluation of each BMP.
5. Develop water demand projections assuming the implementation of the selected BMPs.

Table 6-2. Tier 2 BMPs

No. #	Measure Title
1	Rain-sensor (shut off device) retrofit on irrigation controllers
2	Cash for Grass (turf removal program)
3	Financial Incentives for Being Below Water Budget
4	Financial Rebates for Irrigation Meters
5	Smart Irrigation Controller Rebates
6	Financial Incentives/ Rebates for Irrigation Upgrades
7	Hotel retrofit (w/financial assistance) - CII Existing
8	Offer new accounts reduced connection fees for installing efficient process equipment for selected businesses (restaurants, laundry mat, food/groceries and hospital)
9	Synthetic Turf Rebate
10	High Efficiency Toilet (HET)
11	Dishwasher New Efficient
12	CII Rebates - replace inefficient water using equipment
13	0.5 gal/flush urinals in new buildings
ND1	Rain-sensor shut off device on irrigation controllers
ND2	Smart Irrigation Controller
ND3	High Efficiency Toilet (HET)
ND4	Dishwasher New Efficient
ND5	Clothes washing machines requirement for new residential
ND6	Hot Water on Demand
ND7	High efficiency faucets and showerheads
ND8	Landscape and irrigation requirements

ND = new development

SECTION 7
WATER SUPPLY VERSUS DEMAND COMPARISON

This section provides a comparison of the projected water supply and demand for the Agency from 2005 through 2030. The demand for the Agency represents the demand for Agency wholesale water by the Agency's customers. Water supply to demand comparisons are also provided for single-dry year and multiple-dry year scenarios. The water demands are developed in Section 3, water supplies are defined in Section 4, and recycled water supplies are presented in Section 5 of this report. Decreased water use resulting from water conservation is accounted for in Section 3. The overall conclusion is that the Agency has adequate water supply through the 2030 planning horizon of this Plan, except for single-dry years, starting in 2020. In single-dry years starting in 2020, the Agency will have to work with its contractors to reduce water demands, utilize emergency local sources, or both. The magnitude of these single-dry year potential shortfalls is estimated to be 15 percent of normal demand by 2030.

7.1 Normal Water Supply vs. Demand Comparison

The analysis compares the projected normal water supply and customer demands from 2010 to 2030, in five-year increments. The projected available normal climate year water supply and demands are presented in Tables 7-1 and 7-2, respectively.

Table 7-1. (DWR Table 40) Projected Normal Water Supply – ac-ft/yr

(from DWR table 4)	2010	2015	2020	2025	2030
Supply	78,870	78,870	104,870	104,870	104,870
% of year 2005	100%	100%	133%	133%	133%

Table 7-2. (DWR Table 41) Projected Normal Water Demand – ac-ft/yr

(from DWR table 15)	2010	2015	2020	2025	2030
Demand	77,511	78,853	92,036	100,312	104,869
% of year 2005[a]	113	115	134	146	153

Note: Demands assume compliance with local plumbing codes.
[a] Based on 2005 demand of 68,756 ac-ft/yr.

The comparison of projected water supply and demand is presented in Table 7-3.

Table 7-3 (DWR Table 42) Projected Supply and Demand Comparison – ac-ft/yr

	2010	2015	2020	2025	2030
Supply totals	78,870	78,870	104,870	104,870	104,870
Demand totals	77,511	78,853	92,036	100,312	104,869
Difference	1,359	17	12,834	4,558	1
Difference as % of Supply	2%	0%	12%	4%	0%
Difference as % of Demand	2%	0%	14%	5%	0%

7.2 Dry Year Water Supply vs. Demand Comparison

Tables 7-4 through 7-6 provide a comparison of a single dry year water supply with projected total water use over the next 25 years, in five-year increments.

Table 7-4. (DWR Table 43) Projected Single Dry Year Water Supply – ac-ft/yr

	2010	2015	2020	2025	2030
Supply	78,870	78,870	89,390	89,390	89,390
% of projected normal	100%	100%	85%	85%	85%

Table 7-5. (DWR Table 44) Projected Single Dry Year Water Demand – ac-ft/yr

	2010	2015	2020	2025	2030
Demand	77,511	78,853	92,036	100,312	104,869
% of projected normal	100%	100%	100%	100%	100%

Table 7-6. (DWR Table 45) Projected Single Dry Year Supply and Demand Comparison – ac-ft/yr

	2010	2015	2020	2025	2030
Supply totals	78,870	78,870	89,390	89,390	89,390
Demand totals	77,511	78,853	92,036	100,312	104,869
Difference	1,359	17	-2,646	-10,922	-15,479
Difference as % of Supply	2%	0%	-3%	-12%	-17%
Difference as % of Demand	2%	0%	-3%	-11%	-15%

Tables 7-7 through 7-21 compare the total water supply available in multiple dry water years with projected total water use over the next 25 years, in one-year increments.

Table 7-7. (DWR Table 46) Projected Supply During Multiple Dry Year Period Ending in 2010 – ac-ft/yr

	2006	2007	2008	2009	2010
Supply	78,870	78,870	78,870	78,870	78,870
% of projected normal	100%	100%	100%	100%	100%

Table 7-8. (DWR Table 47) Projected Demand Multiple Dry Year Period Ending in 2010 – ac-ft/yr

	2006	2007	2008	2009	2010
Demand	78,543	78,284	78,026	77,768	77,511
% of projected normal	100	100	100	100	100

Table 7-9. (DWR Table 48) Projected Supply and Demand Comparison during Multiple Dry Year Period Ending in 2010 – ac-ft/yr

	2006	2007	2008	2009	2010
Supply totals	78,870	78,870	78,870	78,870	78,870
Demand totals	78,543	78,284	78,026	77,768	77,511
Difference	327	586	844	1,102	1,359
Difference as % of Supply	0%	1%	1%	1%	2%
Difference as % of Demand	0%	1%	1%	1%	2%

Table 7-10. (DWR Table 49) Projected Supply During Multiple Dry Year Ending in 2015 – ac-ft/yr

	2011	2012	2013	2014	2015
Supply	78,870	78,870	78,870	78,870	78,870
% of projected normal	100	100	100	100	100

Table 7-11. (DWR Table 50) Projected Demand Multiple Dry Year Period Ending in 2015 – ac-ft/yr

	2011	2012	2013	2014	2015
Demand	77,778	78,045	78,314	78,583	78,853
% of projected normal	100	100	100	100	100

Table 7-12. (DWR Table 51) Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2015 - ac-ft/yr

	2011	2012	2013	2014	2015
Supply totals	78,870	78,870	78,870	78,870	78,870
Demand totals	77,778	78,045	78,314	78,583	78,853
Difference	1,092	825	556	287	17
Difference as % of Supply	1%	1%	1%	0%	0%
Difference as % of Demand	1%	1%	1%	0%	0%

Table 7-13. (DWR Table 52) Projected Supply During Multiple Dry Year Period Ending in 2020 – ac-ft/yr

	2016	2017	2018	2019	2020
Supply	104,870	104,870	104,870	104,870	104,870
% of projected normal	100	100	100	100	100

Table 7-14. (DWR Table 53) Projected Demand Multiple Dry Year Period Ending in 2020 – ac-ft/yr

	2016	2017	2018	2019	2020
Demand	81,329	83,883	86,517	89,234	92,036
% of projected normal	100	100	100	100	100

Table 7-15. (DWR Table 54) Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2020 – ac-ft/yr

	2016	2017	2018	2019	2020
Supply totals	104,870	104,870	104,870	104,870	104,870
Demand totals	81,329	83,883	86,517	89,234	92,036
Difference	23,541	20,987	18,353	15,636	12,834
Difference as % of Supply	22%	20%	18%	15%	12%
Difference as % of Demand	29%	25%	21%	18%	14%

Table 7-16. (DWR Table 55) Projected Supply During Multiple Dry Year Period Ending in 2025 – ac-ft/yr

	2021	2022	2023	2024	2025
Supply	104,870	104,870	104,870	104,870	104,870
% of projected normal	100	100	100	100	100

Table 7-17. (DWR Table 56) Projected Multiple Dry Year Period Ending in 2025 – ac-ft/yr

	2021	2022	2023	2024	2025
Demand	93,635	95,261	96,916	98,599	100,312
% of projected normal	100	100	100	100	100

Table 7-18. (DWR Table 57) Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2025 – ac-ft/yr

	2021	2022	2023	2024	2025
Supply totals	104,870	104,870	104,870	104,870	104,870
Demand totals	93,635	95,261	96,916	98,599	100,312
Difference	11,235	9,609	7,954	6,271	4,558
Difference as % of Supply	11%	9%	8%	6%	4%
Difference as % of Demand	12%	10%	8%	6%	5%

Table 7-19. Projected Supply During Multiple Dry Year Period Ending in 2030 – ac-ft/yr

	2026	2027	2028	2029	2030
Supply	104,870	104,870	104,870	104,870	104,870
% of projected normal	100	100	100	100	100

Table 7-20. Projected Multiple Dry Year Period Ending in 2030 – ac-ft/yr

	2026	2027	2028	2029	2030
Total Demand	101,207	102,111	103,022	103,941	104,869
% of projected normal	100	100	100	100	100

Table 7-21. Projected Supply and Demand Comparison During Multiple Dry Year Period Ending in 2030 – ac-ft/yr

	2026	2027	2028	2029	2030
Supply totals	104,870	104,870	104,870	104,870	104,870
Demand totals	101,207	102,111	103,022	103,941	104,869
Difference	3,663	2,759	1,848	929	1
Difference as % of Supply	3%	3%	2%	1%	0%
Difference as % of Demand	4%	3%	2%	1%	0%

SECTION 8
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APPENDIX A

Urban Water Management Plan Public Hearing Notice and Board of Directors' Resolution

(not included)

APPENDIX B

Best Management Practices Report Filing

Best Management Practices Report Filing

BMP 03 Coverage: System Water Audits, Leak Detection and Repair

Reporting Unit:
Sonoma County Water Agency

You are viewing coverage for:
BMP 03
03-04
YRs
DN - UP

BMPs
DN - UP

Memorandum of Understanding

Back to Coverage Reports List

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one of two conditions to be in compliance with BMP 3:

Condition 1: Perform a prescreening audit. If the result is equal to or greater than 0.9 nothing more needs be done.

Condition 2: Perform a prescreening audit. If the result is less than 0.9, perform a full audit in accordance with AWWA's Manual of Water Supply Practices, Water Audits, and Leak Detection.

Test for Conditions 1 and 2

Report Year	Report Period	Pre-Screen Completed	Pre-Screen Result	Full Audit Indicated	Full Audit Completed
1999	99-00	YES	100.0%	No	YES
2000	99-00	YES	100.0%	No	YES
2001	01-02	YES	98.2%	No	NO
2002	01-02	YES	98.2%	No	NO
2003	03-04	YES	96.5%	No	NO
2004	03-04	YES	103.2%	No	NO

Best Management Practices Report Filing

You are viewing coverage for:
BMP 07
03-04
YRs
DN - UP

BMPs
DN - UP

Memorandum of Understanding

Back to Coverage Reports List

BMP 07 Coverage: Public Information Programs

Reporting Unit:
Sonoma County Water Agency

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one condition to comply with BMP 7.

Condition 1: Implement and maintain a public information program consistent with BMP 7's definition.

Test for Condition 1

Year	Report Period	BMP 7 Implementation Year	RU Has Public Information Program?
1999	99-00	1	YES
2000	99-00	2	YES
2001	01-02	3	YES
2002	01-02	4	YES
2003	03-04	5	YES
2004	03-04	6	YES

Best Management Practices Report Filing

You are viewing coverage for:
BMP 08
03-04
YRs
DN - UP

BMPs
DN - UP

Memorandum of Understanding

Back to Coverage Reports List

BMP 08 Coverage: School Education Programs

Reporting Unit:
Sonoma County Water Agency

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one condition to comply with BMP 8.

Condition 1: Implement and maintain a school education program consistent with BMP 8's definition.

Test for Condition 1

Year	Report Period	BMP 8 Implementation Year	RU Has School Education Program?
1999	99-00	1	YES
2000	99-00	2	YES
2001	01-02	3	YES
2002	01-02	4	YES
2003	03-04	5	YES
2004	03-04	6	YES

Best Management Practices Report Filing

You are viewing coverage for:
BMP 11
03-04
YRs
DN - UP

BMPs
DN - UP

Memorandum of Understanding

Back to Coverage Reports List

BMP 11 Coverage: Conservation Pricing

Reporting Unit:
Sonoma County Water Agency

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

An agency must meet one condition to comply with BMP 11.

Agency shall maintain rate structure consistent with BMP 11's definition of conservation pricing. Implementation methods shall be at least as effective as eliminating non-conserving pricing and adopting conserving pricing. For signatories supplying both water and sewer service, this BMP applies to pricing of both water and sewer service. Signatories that supply water but not sewer service shall make good faith efforts to work with sewer agencies so that those sewer agencies adopt conservation pricing for sewer service.

a) Non-conserving pricing provides no incentives to customers to reduce use. Such pricing is characterized by one or more of the following components: rates in which the unit price decreases as the quantity used increases (declining block rates);rates that involve charging customers a fixed amount per billing cycle regardless of the quantity used; pricing in which the typical bill is determined by high fixed charges and low commodity charges.

b) Conservation pricing provides incentives to customers to reduce average or peak use, or both. Such pricing includes: rates designed to recover the cost of providing service; and billing for water and sewer service based on metered water use. Conservation pricing is also characterized by one or more of the following components: rates in which the unit rate is constant regardless of the quantity used (uniform rates) or increases as the quantity used increases (increasing block rates); seasonal rates or excess-use surcharges to reduce peak demands during summer months; rates based upon the longrun marginal cost or the cost of adding the next unit of capacity to the system.

Test for Condition 1

Year	Report Period	RU Employed Non Conserving Rate Structure	RU Meets BMP 11 Coverage Requirement
1999	99-00	NO	YES
2000	99-00	NO	YES
2001	01-02	NO	YES
2002	01-02	NO	YES
2003	03-04	NO	YES
2004	03-04	NO	YES

Best Management Practices Report Filing

You are viewing coverage for:
BMP 12
03-04
YRs
DN - UP

BMPs
DN - UP

Memorandum of Understanding

Back to Coverage Reports List

BMP 12 Coverage: Conservation Coordinator

Reporting Unit:
Sonoma County Water Agency

MOU Exhibit 1 Coverage Requirement

No exemption request filed

Agency indicated "at least as effective as" implementation during report period? No

Agency shall staff and maintain the position of conservation coordinator and provide support staff as necessary.

Test for Compliance

Report Year	Report Period	Conservation Coordinator Position Staffed?	Total Staff on Team (incl. CC)
1999	99-00	NO	2
2000	99-00	YES	6
2001	01-02	YES	7
2002	01-02	YES	7
2003	03-04	YES	12
2004	03-04	YES	12

Water Supply & Reuse

Reporting Unit: **Sonoma County Water Agency**

Year: **2003**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
Russian River	59440	Local Watershed
3 Wells	3358	Groundwater

Total AF: 62798

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
City of Santa Rosa	22307	retail
North Marin Water District	7910	retail
City of Petaluma	10772	retail
City of Rohnert Park	2601	retail
Valley of the Moon Water District	2879	retail
City of Sonoma	2533	retail
City of Cotati	918	retail
ForestvilleWater District	517	retail
Marin Municipal Water District	8311	retail
Other	1859	retail

Total AF: 60607

Reported as of 11/1

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2003**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	60606.5
b. Determine other system verifiable uses (AF)	0
c. Determine total supply into the system (AF)	62798.04
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.97
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	no
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
6. Does your agency operate a system leak detection program?	no
a. If yes, describe the leak detection program:	

B. Survey Data

1. Total number of miles of distribution system line.	89.4
2. Number of miles of distribution system line surveyed.	89.4

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

Reported as of 11/1

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2003**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

see 2002 program description

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	15
b. Public Service Announcement	yes	10
c. Bill Inserts / Newsletters / Brochures	yes	1
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	no	
f. Special Events, Media Events	yes	2
g. Speaker's Bureau	yes	2
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	85550	95500
2. Actual Expenditures	94049	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

2a. is the number of invoices 2f. ch 50 live remote at yardbids, and at fair

Reported as of 11/1

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2003**

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	0	0	0
Grades 4th-6th	yes	0	0	0
Grades 7th-8th	yes	0	0	0
High School	yes	0	0	0

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 9/1/1988

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	350500	355000
2. Actual Expenditures	345515	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Beginning with the 2003 reporting period, retail water agencies are reporting SCWA school education program information except budget.

Reported as of 11/1

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2003**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	186400	43213	**8**	No		
2	yes	3000	5328	**9**	yes	72500	48266
3	yes	60000	83070	**10**	No		
4	yes	24000	51487	**11**	yes	4500	58213
5	yes	69500	72826	**12**	yes	101101	158332
6	yes	149390	159625	**13**	yes	12200	4086
7	yes	102000	86537	**14**	yes	731134	368690

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	No
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	yes
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

Qualified Staff	No. FTE Staff		Qualified Staff	No. FTE Staff

BMP	Available for BMP?	Assigned to BMP	BMP	Available for BMP?	Assigned to BMP
1	yes	.5	**8**	yes	2.5
2	No	0	**9**	yes	2
3	No	0	**10**	yes	2
4	No	0	**11**	No	0
5	yes	1	**12**	yes	1
6	yes	.5	**13**	No	0
7	yes	1	**14**	yes	1

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	yes
4	No	**11**	No
5	yes	**12**	yes
6	yes	**13**	No
7	yes	**14**	No

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	5000000	5000000
2. Actual Expenditures	5010000	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

budget includes 7247 and LRT2

Reported as of 11/1

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2003**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
2. Commercial	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
3. Industrial	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
4. Institutional / Government	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
5. Irrigation	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
6. Other	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$23563584

d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 11/1

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2003**

A. Implementation

1. Does your Agency have a conservation coordinator?	yes
2. Is this a full-time position?	yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?	
4. Partner agency's name:	
5. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	100%
b. Coordinator's Name	Lynn Hulme
c. Coordinator's Title	Water Conservation Coordinator
d. Coordinator's Experience and Number of Years	19 years of water conservation experience
e. Date Coordinator's position was created (mm/dd/yyyy)	6/7/1999
6. Number of conservation staff, including Conservation Coordinator.	12

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	182000	182000
2. Actual Expenditures	178485	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	no
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

D. Comments

staff = 1 cord, 4 wc, 2-1/2 ed, 1 pi, 3 intern budget = cord salary + oh

Reported as of 11/1

Water Supply & Reuse

Reporting Unit: **Sonoma County Water Agency**

Year: **2004**

Water Supply Source Information

Supply Source Name	Quantity (AF) Supplied	Supply Type
Russian River	63681	Local Watershed
3 Production Wells	5140	Groundwater

Total AF: 68821

Purchaser Information

Name of Agency	Quantity (AF) Supplied	Retailer or Wholesaler
City of Santa Rosa	24421	retail
North Marin Water District	9498	retail
City of Petaluma	11294	retail
City of Rohnert Park	4710	retail
Valley of the Moon Water District	3157	retail
City of Sonoma	2611	retail
City of Cotati	1071	retail
ForestvilleWater District	537	retail
Marin Municipal Water District	7792	retail
Other	1466	retail

Total AF: 66557

Reported as of 11/1

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2004**

A. Implementation

1. Has your agency completed a pre-screening system audit for this reporting year?	yes
2. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	66349
b. Determine other system verifiable uses (AF)	0
c. Determine total supply into the system (AF)	68821
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required.	0.96
3. Does your agency keep necessary data on file to verify the values used to calculate verifiable uses as a percent of total production?	yes
4. Did your agency complete a full-scale audit during this report year?	no
5. Does your agency maintain in-house records of audit results or the completed AWWA audit worksheets for the completed audit?	yes
6. Does your agency operate a system leak detection program?	yes

a. If yes, describe the leak detection program:

Every year we walk the entire length of pipeline to look for evidence of water losses.

B. Survey Data

1. Total number of miles of distribution system line.	89.4
2. Number of miles of distribution system line surveyed.	89.4

C. System Audit / Leak Detection Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

Reported as of 11/1

BMP 07: Public Information Programs

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2004**

A. Implementation

1. Does your agency maintain an active public information program to promote and educate customers about water conservation? yes

a. If YES, describe the program and how it's organized.

see 2002 program description

2. Indicate which and how many of the following activities are included in your public information program.

Public Information Program Activity	Yes/No	Number of Events
a. Paid Advertising	yes	14
b. Public Service Announcement	yes	10
c. Bill Inserts / Newsletters / Brochures	no	
d. Bill showing water usage in comparison to previous year's usage	no	
e. Demonstration Gardens	no	
f. Special Events, Media Events	yes	2
g. Speaker's Bureau	yes	3
h. Program to coordinate with other government agencies, industry and public interest groups and media	yes	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	95500	97500
2. Actual Expenditures	94630	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

See SCWA 2004 BMP file for program and expenditure details.

Reported as of 11/1

BMP 08: School Education Programs

Reporting Unit:
Sonoma County Water Agency

BMP Form Status:
100% Complete

Year:
2004

A. Implementation

1.Has your agency implemented a school information program to promote water conservation? yes

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	yes	0	0	0
Grades 4th-6th	yes	0	0	0
Grades 7th-8th	yes	0	0	0
High School	yes	0	0	0

3. Did your Agency's materials meet state education framework requirements? yes

4. When did your Agency begin implementing this program? 9/1/1988

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	355000	375000
2. Actual Expenditures	373987	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

These numbers are from the 2003 - 2004 school year. Number of students reached includes both direct instruction and education materials requested and distributed to classrooms.

Reported as of 11/1

BMP 10: Wholesale Agency Assistance Programs

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2004**

A. Implementation

1. Financial Support by BMP

BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded	BMP	Financial Incentives Offered?	Budgeted Amount	Amount Awarded
1	yes	75473	59458	**8**	No		
2	yes	13960	9608	**9**	yes	82893	49669
3	yes	82962	250353	**10**	No		
4	yes	51487	80705	**11**	yes	0	4399.49
5	yes	86541	76028	**12**	yes	182403	325972
6	yes	152475	226650	**13**	yes	411	2930
7	yes	76291	144171	**14**	yes	365678	206890

2. Technical Support

a. Has your agency conducted or funded workshops addressing CUWCC procedures for calculating program savings, costs and cost-effectiveness?	No
b. Has your agency conducted or funded workshops addressing retail agencies' BMP implementation reporting requirements?	yes
c. Has your agency conducted or funded workshops addressing:	
1) ULFT replacement	yes
2) Residential retrofits	No
3) Commercial, industrial, and institutional surveys	yes
4) Residential and large turf irrigation	yes
5) Conservation-related rates and pricing	No

3. Staff Resources by BMP

Qualified Staff	No. FTE Staff		Qualified Staff	No. FTE Staff

BMP	Available for BMP?	Assigned to BMP	BMP	Available for BMP?	Assigned to BMP
1	yes	.5	**8**	yes	2.5
2	yes	.5	**9**	yes	1.5
3	No	0	**10**	yes	1.5
4	No	0	**11**	No	0
5	yes	2	**12**	yes	1
6	yes	.5	**13**	No	0
7	yes	1.5	**14**	yes	.5

4. Regional Programs by BMP

BMP	Implementation/ Management Program?	BMP	Implementation/ Management Program?
1	No	**8**	yes
2	No	**9**	yes
3	No	**10**	yes
4	No	**11**	No
5	yes	**12**	yes
6	yes	**13**	No
7	yes	**14**	No

B. Wholesale Agency Assistance Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	5000000	2894697
2. Actual Expenditures	4417641	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

budget includes 7247 and LRT2 (see my file)

Reported as of 11/1

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2004**

A. Implementation

Rate Structure Data Volumetric Rates for Water Service by Customer Class

1. Residential	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
2. Commercial	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
3. Industrial	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
4. Institutional / Government	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
5. Irrigation	
a. Water Rate Structure	
b. Sewer Rate Structure	
c. Total Revenue from Volumetric Rates	$
d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$
6. Other	
a. Water Rate Structure	Uniform
b. Sewer Rate Structure	Service Not Provided
c. Total Revenue from Volumetric Rates	$26482855

d. Total Revenue from Non-Volumetric Charges, Fees and other Revenue Sources	$0

B. Conservation Pricing Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

Reported as of 11/1

BMP 12: Conservation Coordinator

Reporting Unit:	BMP Form Status:	Year:
Sonoma County Water Agency	**100% Complete**	**2004**

A. Implementation

1. Does your Agency have a conservation coordinator? yes
2. Is this a full-time position? yes
3. If no, is the coordinator supplied by another agency with which you cooperate in a regional conservation program ?
4. Partner agency's name:
5. If your agency supplies the conservation coordinator:
   - a. What percent is this conservation coordinator's position? 100%
   - b. Coordinator's Name Lynn Hulme
   - c. Coordinator's Title Water Conservation Coordinator
   - d. Coordinator's Experience and Number of Years 20 years of water conservation experience
   - e. Date Coordinator's position was created (mm/dd/yyyy) 6/7/1999
6. Number of conservation staff, including Conservation Coordinator. 12

B. Conservation Staff Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures	182000	220284
2. Actual Expenditures	193827	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? no
   - a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

staff = 1 cord, 4 spec, 2-1/2 ed, 3 intens budget = cord salary +oh

Reported as of 11/1

APPENDIX C

Water Shortage Contingency Analysis

WATER SHORTAGE CONTINGENCY ANALYSIS

This water shortage contingency analysis contains the elements required by Water Code section 10632, including actions in the event of a water shortage, information on the estimated three-year minimum water supply, information on emergency preparedness and plans for catastrophic events, prohibitions, penalties, and consumption reduction methods, revenue impacts caused by reduced water sales during shortages, and a shortage contingency resolution and mechanisms for determining actual reductions in use during a shortage.

As a water wholesaler, the Agency does not have the ability to impose use restrictions or other requirements directly on end users of water in the event of a shortage; such actions must be taken by the Agency's wholesale customers. Accordingly, this water shortage contingency analysis is limited to those actions that the Agency can take vis-à-vis its wholesale customers in the event of a water shortage.

The minimum water supply available during the next few years during a multiple year drought is presented in Table 7-7 of the Agency's 2005 urban water management plan. No supply reduction is projected under this scenario. Therefore, DWR Table 24 is not included.

Stages of Action to be Taken in Response to Water Supply Shortages (Water Code §10632(a))

Section 3.5(a) of the Restructured Agreement for Water Supply describes the manner in which the Agency is to allocate water to its customers in the event of a water supply shortage, and section 3.5(b) of the Restructured Agreement describes the manner in which the Agency is to allocate water to its customers in the event of a temporary impairment of the capacity of some or all of the Agency's transmission system. Section 3.5(d) of the Restructured Agreement requires the Agency to "have an adopted water shortage allocation methodology sufficient to inform each Customer of the water that would be available to it pursuant to Section 3.5(a) in the event of reasonably anticipated shortages, which methodology shall be consistent with this Section 3.5 and shall be included in the Urban Water Management Plan prepared pursuant to Section 2.7."

On April 18, 2006, the Agency's Board of Directors adopted Resolution No. 06-0342, which approved a water allocation methodology developed by the Agency and its water contractors. Resolution No. 06-0342 recognized that the methodology could be modified in the future as additional data regarding customer demands, local supply, and recycled water became available.

In addition, the Agency's water rights permits contain a term requiring the Agency to impose "a mandatory thirty percent deficiency in deliveries from the Russian River … whenever the quantity water in storage at Lake Sonoma drops below 100,000 acre-feet before July 15 of any year." The deficiency remains in effect until (1) storage in Lake Sonoma is greater than 70,000 AF by December 31 of the same year (2) the Agency has demonstrated to the Chief, Division of Water Rights, that storage in Lake Sonoma will not fall below 70,000 ac-ft or (3) hydrologic conditions result in sufficient flow to satisfy the Agency's demands at Wohler and Mirabel Park and minimum flow requirements in the Russian River at Guerneville.

One of the most important functions provided by the Agency is to monitor water supply conditions to gauge the likelihood of water shortages so that the Agency's wholesale customers will be prepared to respond to the shortages. The Agency constantly monitors the reservoir levels at Lake Pillsbury, Lake Mendocino, and Lake Sonoma, and estimates flows in and out of those reservoirs, as well as natural flows into and diversions from the Russian River and Dry Creek. By using this data as well as historical data regarding water use in different climactic conditions, the Agency can obtain an idea of when a water shortage may be imminent. As noted in Section 7 of the Agency's urban water management plan, however, except in a critically dry year, the Agency's water supplies are sufficient to meet its transmission system demands.

If it appeared that a water supply shortage might occur, the Agency's first stage of action would be to notify its contractors and customers, and the general public, of that possibility. Depending on the severity of the shortage, the Agency would work with its contractors and customers to encourage voluntary demand reduction measures. The Agency would also encourage its contractors and other customers to maximize use of local water supplies. Finally, the Agency would take steps to publicize the potential shortage, and to encourage agricultural and non-Agency-related diverters from the Russian River and Dry Creek to reduce diversions to the extent possible.

If these voluntary measures were insufficient, or if climactic conditions (or the 30% cutback provision in the Agency's water rights permits) were likely to lead to a situation in which transmission system demands would exceed the Agency's available water supply, the Agency would then calculate the amount of water available to its contractors, other Agency customers, Russian River Diverters, and MMWD under existing contractual provisions, including Section 3.5 of the Restructured Agreement, by using the then-existing allocation methodology adopted pursuant to Section 3.5(d) of the Restructured Agreement. In the event of a severe water supply shortage, the Agency could also petition the State Water Resources Control Board for temporary relief from the minimum instream flow requirements in the Russian River and Dry Creek, in order to conserve the remaining water supply in Lake Sonoma and Lake Mendocino. Table 1 presents the stages of action.

Table 1. (DWR Table 23) Water Supply Shortage Stages and Conditions

Stages of Action		
Stage No.	Water Supply Conditions	% Shortage
1	Total system storage and rate of decline and Agency customer demands	0-10
2	Total system storage and rate of decline and Agency customer demands	10 to 65

Under the allocation methodology currently adopted by the Agency, in the event of a 50% cutback in the Agency's water supply, the amounts allocated to contractors and others would be as presented in Table 2 (assumes available supply is 39,435 ac-ft, which is 50% of the sum of 75,000 ac-ft of Russian River diversions plus 3,870 ac-ft of groundwater production):

Table 2. Allocations

Regular Customers	Allocation, ac-ft/yr
Cotati	681
Petaluma	6,080
Rohnert Park	2,872
Sonoma	1,239
Windsor (From Transmission System)	312
North Marin Water District (MMWD)	4,707
Santa Rosa	16,661
Valley of the Moon Water District	2,128
Other Agency Customers	940
Sub-Total	35,619
Marin Municipal Water District	666
Russian River Customers (includes Windsor direct diversions)	3,150
Total	39,435

Catastrophic Supply Interruption Plan - Water Code Section 10632 (c)

In accordance with the Emergency Services Act has developed an Emergency Operation Plan (EOP). The EOP guides response to unpredicted catastrophic events that might impact water delivery. The EOP outlines standard operating procedures for all levels of emergency, from minor accidents to major disasters and are coordinated with the water contractors EOPs. Table 3 summarizes the some of the actions in the event of specific catastrophic events.

Table 3. (DWR Table 25) Preparation Actions for a Catastrophe

Possible Catastrophe	Summary of Actions
Earthquake	Shut-off isolation valves and above ground use of flexible piping for ruptured mains
Toxic Spills	Use of groundwater wells
Fire	Storage supplies for fire flows
Power outage or grid failure	Portable and emergency generators available for most Agency facilities
Severe Winter Storms	Portable and emergency generators available for most Agency facilities
Hot Weather	Portable and emergency generators available for most Agency facilities

Prohibitions, Penalties, and Consumption Reduction (Water Code §10632(d)-(f))

As noted earlier, as a wholesale supplier, the Agency has no ability to directly restrict the use of water by end users, or to impose financial penalties on end users for excessive use. However, under the Restructured Agreement, the Agency has a number of methods available to it to ensure that its contractors do not use more than the amount of water allocated by the Agency during a time of shortage.

Under Section 3.5(e) of the Restructured Agreement, a contractor taking more than its allocated amount of water during a shortage is subject to a liquidated damages surcharge equal to 50% of the then-current operations and maintenance charge for each acre-foot of water taken by the contractor in excess of its allocation. Section 3.5(e) also reserves to the Agency all other rights it may have to limit contractors and other customers to their allocated amounts, including physically limiting the quantity of water taken to the amounts allocated, and pursuing all other available legal and equitable remedies applicable to such violations. Finally, Section 3.5(e) allows the Water Advisory Committee to request that the Agency physically limit the quantity of water taken by a Regular Customer to the

amounts authorized by Section 3.5, or pursue all other available legal and equitable remedies applicable to such violations.

In addition to these methods of reducing consumption, Agency contractors have ordinances placing limitations on the uses of water by end customers in the event of a water shortage. These ordinances were developed in consultation with the Agency and are described in detail in the contractor's individual Urban Water Management Plans. Tables 4, 5, and 6 present the mandatory provisions, consumption reduction methods, and penalties and charges, respectively.

Table 4. (DWR Table 26) Mandatory Prohibitions

Prohibitions	Stage When Prohibition Becomes Mandatory
Use of Water in Excess of Allocation under Section 3.5 of Restructured Agreement or other contractual provision	2

Table 5. (DWR Table 27) Consumption Reduction Methods

Consumption Reduction Methods	Stage When Method Takes Effect	Projected Reduction (%)
Notification of Potential Water Shortage	Stage 1	
Encourage Reduction in Use by Customers, RR Diverters, and Agricultural Diverters through Public Outreach	Stage 1	Varies
Imposition of Section 3.5 Allocations	Stage 2	Varies

Table 6. (DWR Table 28) Penalties and Charges

Penalties or Charges	Stage When Penalty Takes Effect
Liquidated Damage Surcharge for Taking in Excess of Allocation	Stage 2
Physical Limitation on Deliveries to Customers Taking in Excess of Allocation	Stage 2
Legal Remedies against Customers Taking in Excess of Allocation	Stage 2

Analysis of Revenue Impacts of Reduced Sales During Shortages (Water Code §10632(g))

Although a water shortage would result in reduced water deliveries by the Agency, a water shortage would not have any material impacts on the Agency's financial condition.

Under the Restructured Agreement, the Agency imposes charges on the contractors and other customers on an acre-foot basis. The charges are set in an amount necessary to produce revenues to meet the Agency's revenue bond obligations and expected operations and maintenance, and to produce a prudent reserve in an amount determined by the Water Advisory Committee. Charges are set annually each spring, to be effective for the following fiscal year (July 1 to June 30). In computing the charges, the Restructured Agreement requires the Agency to assume that the amount of water to be delivered from each aqueduct of the transmission system will be the same as the amount of water delivered from said aqueduct during the twelve months preceding such establishment, or the average annual amount of water delivered during the preceding 36 months, whichever is less. In addition, however, the Restructured Agreement provides that "[i]f because of drought or other water-supply reduction, state or federal order, or other similar condition, the Agency anticipates that any such quantities will not be predictive of future usage, the Agency may use a different amount with the prior approval of the Water Advisory Committee." Thus the Agency has the ability to increase water rates, with Water Advisory Committee approval, in order to address a pending water supply shortage.

In addition, in order to protect the interest of the holders of revenue bonds issued to finance transmission system facilities, the Restructured Agreement provides that "it is the intention of the parties that the charges set forth herein will be sufficient to pay the Revenue Bonds and to meet the Revenue Bond Obligations not met from other sources of funds," and that the contractors "agree to pay promptly such charges notwithstanding any deficiency in the quantity or quality of water to which they or any of them would be entitled pursuant to this Agreement." The term "Revenue Bond Obligations" includes the Agency's operations and maintenance costs. The Restructured Agreement thus requires the contractors to ensure that the Agency has sufficient funds to operate and maintain the transmission system, and to pay off the holders of revenue bonds, notwithstanding a water supply shortage leading to a reduction in deliveries.

A water shortage would reduce the Agency's transmission system expenses. The biggest component of the Agency's transmission system expenses is the cost of electrical power to pump water from the Russian River and deliver it through the various aqueducts to its customers. The less water the Agency pumps, the less the Agency pays for power; thus a water shortage would reduce, not

increase, the Agency's transmission system expenses. Tables 7, and 8 summarize the measures to overcome revenue and expenditure impacts.

Table 7. (DWR Table 29) Proposed Measures to Overcome Revenue Impacts

Names of measures	Summary of Effects
Rate adjustments	Offset loss in revenue
Use of financial reserves	Offset loss in revenue

Table 8. (DWR Table 30) Proposed Measures to Overcome Expenditure Impacts

Names of measures	Summary of Effects
Reconnection fees	Support water conservation programs
Excessive use charges	Support water conservation programs
Construction offset programs	Support water conservation programs

Water Shortage Contingency Resolution and Use Monitoring Procedure (Water Code §10632(h) and (i))

As noted above, the Agency's Board has approved an allocation methodology for use by the Agency in the event of a water supply shortage. That ordinance and the allocation methodology are attached as Attachments 1 and 2.

If the Agency allocates water supplies to its contractors and customers pursuant to Section 3.5 of the Restructured Agreement, other contractual provisions, and the allocation methodology, the Agency will monitor compliance with the allocation by increasing the frequency of its readings of meters showing the amount of water being taken by its contractors and customers. Table 9 presents the monitoring mechanisms.

Table 9. (DWR Table 31) Water Use Monitoring Mechanisms

Mechanisms for determining actual reductions	Data Expected
Meter Reading	Water Used by Each Contractor/Customer

ATTACHMENT 1

Model Water Shortage Emergency Ordinance

MODEL WATER SHORTAGE EMERGENCY ORDINANCE

ORDINANCE NO.

AN ORDINANCE OF <CITY/DISTRICT> DECLARING THE EXISTENCE OF A WATER SHORTAGE EMERGENCY CONDITION WITHIN THE <CITY/DISTRICT>, PROHIBITING THE WASTE AND NON-ESSENTIAL USE OF WATER, AND PROVIDING FOR THE CONSERVATION OF THE WATER SUPPLY OF THE <CITY/DISTRICT>

BE IT ORDAINED by the <City Council /Board of Directors> as follows:

Section 1. Declaration of a Water Shortage Emergency

The <City Council /Board of Directors> does hereby find and declare as follows:

(a) Pursuant to Resolution No._____ duly adopted by this <Council/Board> on _<date1>_, a public hearing was held on _____<date2>_____, on the matter of whether the <City/District> should declare that a water shortage emergency condition exists within the water service area of the <City/District>.

(b) Notice of said hearing was published in the ___<name of paper>_____, a newspaper of general circulation printed and published within said water service area of the <City/District>.

(c) At said hearing all persons present were given an opportunity to be heard and all persons desiring to be heard were heard.

(d) Said hearing was called, noticed and held in all respects as required by law.

(e) The <City Council /Board of Directors> heard and has considered each protest against the declaration and all evidence presented at said hearing.

(f) A water shortage emergency condition exists and prevails within the territory of the <City/District>. Said water shortage exists by reason of the fact that the ordinary demands and requirements of the water consumers in the <City/District> water service area cannot be met and satisfied by the water supplies now available to this <City/District> without depleting the water supply to the extent that there would be insufficient water for human consumption, sanitation and fire protection.

Section 2. Purpose and Authority

The purpose of this ordinance is to conserve the water supply of the <City/District> for the greatest public benefit with particular regard to public health, fire protection and domestic use, to conserve water by reducing waste, and to the extent necessary by reason of the existing water shortage emergency condition to reduce water use fairly and equitably. This ordinance is adopted pursuant to Water Code Sections 350 to and including 358, and Sections 31026 to and including 31029.

Section 3. Definitions

The terms used in this ordinance shall have the following meanings:

(a) Corresponding billing period - A similar billing period occurring in a prior designated year to which current water use is compared for the purpose of determining the percent reduction in use.

(b) Drip system - An irrigation system downstream of a reduced pressure device fitted with drip emitters, bubblers or low pressure micro-jet sprayers.

(c) ETo - Evapotranspiration demand reported as reference evapotranspiration for each California Irrigation Management Information System (CIMIS) weather station located in Sonoma and Marin Counties. (Local ETo data is available by calling <insert Local CIMIS hot-line phone number>.

(d) ETo Adjustment Factor - A factor to multiply times ETo to determine the appropriate amount of water to apply to turf grass while rationing is in effect. The amount of water to apply is found by multiplying the area of turf to be irrigated (square ft) times the ETo Adjustment Factor (see percentage in Section 9(c)) times ETo (inches for a given period of time - typically 3 to 7 days) times 7.48/12 to convert to gallons.

(e) Healthcare and public safety use - Use of water by customers whose principal purpose is to provide health services to the public (such as hospitals, clinics, invalid and senior care facilities and homes, and doctor, dentist, optometrist and chiropractor offices, etc.) or which provide vital public safety services (such as police stations, jails, fire stations, utility services, etc.). Not included in this class are office buildings that provide solely administration services (such as health insurance organizations, etc.) or landscaping uses at any healthcare or public safety site.

(f) Irrigation only use - Water use downstream of a <City/District> owned billing meter whose principal purpose and design is to serve irrigation use.

(g) Overall mandatory rationing requirement - The percent reduction in overall withdrawals from the water system determined by the <City Council/Board of Directors> to be necessary in order to achieve and to safely survive the water shortage emergency.

(h) Run-time - The duration in minutes either programmed or set for each valve controlled by an irrigation system clock (controller) or manually operated.

(i) Shop unit - A type of residential unit which is separately metered and which involves a dwelling unit that is incorporated into the premises of a business - sometimes also referred to as a shop house or live/work unit.

(j) Sprinklers - As used in this ordinance the term sprinklers means an irrigation sprinkler connected to a hose, irrigation sprinklers connected to an in-ground pipe system, and soaker

hoses or porous pipelines operating off of normal service pressure.

Section 4. Effect of Ordinance

This ordinance shall take effect immediately, shall supersede and control over any other ordinance or regulation of the <City/District> in conflict herewith, and shall remain in effect until the <City Council /Board of Directors> declares that the water shortage emergency has ended.

Section 5. Suspension of New Connections to the <City's/District's> Water System

(a) From the effective date of this ordinance until the date the <City Council /Board of Directors> by resolution declares that the water shortage has ended, which period is hereinafter referred to as the suspension period, no new or enlarged connection shall be made to the <City's/District's> water system except the following:

(1) Connection pursuant to the terms of connection agreements which prior to <date1>, had been executed or had been authorized by the <City/District> to be executed;

(2) Connection of fire hydrants.

(3) Connection of property previously supplied with water from a private water source (such as a well or spring) upon submittal and approval of the <title of designated official> evidence that the private source has failed or dried up or has otherwise been impaired by the drought or water shortage event to such a degree that the source no longer can meet minimal potable water needs of the applicant.

(4) During Stage 2 and 3 if the overall mandatory rationing requirement is equal to or less than 30%, connection of property for which the applicant has obtained all approvals required for development, except potable water supply, and agrees to defer installation of landscaping until after the suspension period.

(5) During Stage 2 and 3 if the overall mandatory rationing requirement is greater than 30%, connection of property for which the applicant: has obtained all approvals required for development except potable water supply; agrees to defer installation of landscaping until after the suspension period; and, either retrofits good quality water conservation fixtures and devices (1.6 gallon per flush toilets, 2.5 gallon per minute shower heads, and 2.2 gallon per minute faucet aerators for kitchen sinks and lavatories) in five existing single family detached dwelling units served by the <City/District>, or pays the <City/District> $1,500 per equivalent single family detached dwelling unit for which water service is being applied. These payments shall be used by the <City's/District's> to help fund its expanded water conservation program efforts during the suspension period. If an applicant chooses the retrofit option and a selected home already has some water conserving fixtures, applicant shall install conservation fixtures in additional dwellings as determined necessary by the <title of designated official>.

(b) During the suspension period, applications for water service will be processed only if the applicant acknowledges in writing that such processing shall be at the risk and expense of the applicant and that if the application is approved in accordance with the <City's code/District's regulations>, such approval shall confer no right upon the applicant or anyone else until the

suspension period has expired, and that the applicant releases the <City/District> from all claims of damage arising out of or in any manner connected with the suspension of connections.

(c) Upon the termination of the suspension period, the <City/District> will make connections to its water system in accordance with its <code/regulations> and the terms of connection agreements for all said applications approved during the suspension period. The water supply then available to the <City/District> will be apportioned equitably among all the customers then being served by the <City/District> without discrimination against services approved during the suspension period.

(d) Nothing herein shall prohibit or restrict any modification, relocation or replacement of a connection to the <City's/District's> system if the <title of designated official> determines that the demand upon the <City's/District's> water supply will not be increased thereby.

Section 6. Waste of Water Prohibited *(Note: If your City/District has adopted a Water Waste Prohibition ordinance as a permanent feature of your Water Conservation Program, Subsection (a) below can be replaced with a reference to same.)*

(a) No water furnished by the <City/District> shall be wasted. Waste of water includes, but is not limited to, the following:

(1) Washing of sidewalks, walkways, driveways, parking lots and other hard-surfaced areas by direct hosing, except as may be necessary to properly dispose of flammable or other dangerous liquids or substances, wash away spills that present a trip and fall hazard, or to prevent or eliminate materials dangerous to the public health and safety.

(2) Escape of water through breaks or leaks within the customers plumbing or private distribution system for any substantial period of time within which such break or leak should reasonably have been discovered and corrected. It shall be presumed that a period of seventy two (72) hours after the customer discovers such a break or leak or receives notice from the <City/District>, is a reasonable time within which to correct such break or leak or, as a minimum, to stop the flow of water from such break or leak (also see Section 7 (2).

(3) Irrigation in a manner or to an extent which allows excessive run-off of water or unreasonable over-spray of the areas being watered. Every customer is deemed to have his water system under control at all times, to know the manner and extent of his water use and any run off, and to employ available alternatives to apply irrigation water in a reasonably efficient manner.

(4) Washing cars, boats, trailers or other vehicles and machinery directly with a hose not equipped with a shutoff nozzle.

(6) Water for non-recycling decorative water fountains.

(6) Water for single pass evaporative cooling systems for air conditioning in all connections installed after <date3> unless required for health or safety reasons.

(7) Water for new non-recirculating conveyor car wash systems.

(8) Water for new non-recirculating industrial clothes wash systems.

(b) Waste of water shall also include failure to put to reasonable beneficial use any water withdrawn from the <City's/District's> water system as determined by the <title of designated official>.

Section 7. Prohibition of Non-Essential Use of Water

(a) No water furnished by the <City/District> shall be used for any purpose declared to be non-essential by this ordinance. The restrictions in this section shall not apply to use of recycled wastewater furnished by a government agency.

Stage 1 - Introductory Stage (15% volunteer reduction)

(b) As of the effective date of this ordinance and continuing until Stage 2 is implemented, all customers are asked to voluntarily reduce consumption of water furnished by the <City/District> to 15% and all customers of the <City/District> are requested to:

(1) Apply irrigation water only during the evening and early morning hours to reduce evaporation losses.

(2) Inspect all irrigation systems, repair leaks, and adjust spray heads to provide optimum coverage and eliminate avoidable over-spray.

(3) For irrigation valves controlling water applied to turf grass, vary the minutes of run-time consistent with fluctuations in weather.

(4) Reduce minutes of run-time for each irrigation cycle if water begins to run-off to gutters and ditches before the irrigation cycle is completed.

(5) Become informed about and strictly adhere to the <City's/District's> Water Waste Prohibition Ordinance (refer to Section 6 hereof).

(6) Utilize water conservation incentive, rebate and giveaway programs to replace water guzzling plumbing fixtures and appliances with water efficient models.

(7) Take advantage of the free information available from the <City/District> on how to use water efficiently, read a water meter, repair ordinary leaks, and how to apply water efficiently to the landscape.

(c) The following uses are declared to be non-essential from and after <date1>

(1) Refilling a swimming pool drained after <date4>;

(2) Water escaping from a broken pipe or leak once discovered and after passage of a reasonable amount of time to determine how to shut off the water;

(3) Non-commercial washing of motor vehicles, trailers and boats except from a bucket with use of a hose equipped with a shutoff nozzle for a quick rinse.

Stage 2 - Mandatory Rationing - Community Cooperation Method (X1% reduction)

(d) Stage 2 sets forth an overall mandatory rationing requirement of X1% for customers to

collectively meet. In determining compliance, the <City/District> shall rely on water production records comparing current production trends to trends that would normally be expected to occur. Individual customers who can conserve more than the overall mandatory requirement of X1% are requested and strongly encouraged to do so voluntarily in order to help those customers who would incur economic hardship in order to meet the rationing level.

(e) During Stage 2, the following additional uses are declared to be non-essential from and after <date5> :

(1) Any residential use (excluding irrigation only use) in excess of X2% of the amount used by the customer during the corresponding billing period in <year1>.

(2) Any irrigation only use in excess of X3% of the amount used by the customer during the corresponding billing period in <year1>.

(3) Any non-residential use (excluding irrigation only use and healthcare and public safety use) in excess of X4% of the amount used by the customer during the corresponding billing period in <year1>.

(4) Any water used for healthcare and public safety (excluding irrigation only use) in excess of X5% of the amount used by the customer during the corresponding billing period in <year1>.

(5) Any use of water from a fire hydrant except for fighting fires, human consumption, stock water, essential flushing and clean-up purposes, and water used for construction needs. If the overall mandatory rationing requirement is greater than 30%, a permit issued by the <title of designated official> shall be required for all hydrant use except for water used for fighting fires or for other emergency use deemed essential by the a fire chief.

(6) Watering of any existing turf grass, ornamental plant, garden, landscaped area, tree, shrub or other plant except from a hand-held hose or container or drip irrigation system except as provided in Section 9 hereof.

(7) Watering of new turf grass or replacement turf grass. If the overall mandatory rationing requirement is greater than 30%, this restriction is extended and applies to watering of any new landscape or replacement landscape except in cases where the replacement landscapes will use less water than the original landscape.

(8) Initial filling of any swimming pool for which approval of a construction permit issued by the <City/County> was made after <date5>;

(9) Use for service of drinking water at any restaurant, café, cafeteria or other public place where food is sold, served or offered for sale, unless expressly requested by a patron.

(f) Except in cases of blatant non-compliance, as solely determined by the <title of designated official>, individual billing records will generally not be used during Stage 2 to determine compliance with the provisions of Subsections (e) (1), (2), (3) and (4), it being assumed that customers will cooperate to do the best that they can to individually meet or exceed the overall mandatory rationing requirement. Violations of non-essential uses that come to the attention of the <title of designated official>, however, will be enforced pursuant to the provisions of Section 11 hereof.

Stage 3 - Mandatory Rationing - Allotment Method (X1% reduction)

(g) From and after the date that the <City Council/Board of Directors>, by resolution, determines that the Stage 2 rationing method is not working and the overall mandatory rationing requirement of (X1%) is or may not be met, and/or, that it would be more equitable to apportion the available supply by a fixed allotment, water use in excess of the following allotments established for each meter are in addition declared to be non-essential:

(1) Residential meters serving single family detached homes including mother-in-law or second units that are served by the same meter: X6 gallons per capita per day times the number of permanent occupants. Permanent occupants shall be a whole number. Babies, children, adults and senior citizens whose principal place of residence is in the dwelling in question shall each count as one occupant. In determining the number of permanent occupants, the <City/District> shall rely upon data it has acquired from the customer or other sources. Provided sufficient time is available, the <City/District> will attempt to canvas customers to obtain current data on permanent household occupants.

(2) Residential meters serving multiple units: X2% of the amount used by the customer during the corresponding billing period in <year1>.

(3) Irrigation only meters: X3% of the amount used by the customer during the corresponding billing period in <year1>.

(4) Meters serving any non-residential use (excluding irrigation only metered use and healthcare and public safety use): X4% of the amount used by the customer during the corresponding billing period in <year1>.

(5) Meters serving water used for healthcare and public safety (excluding irrigation only use): X5% of the amount used by the customer during the corresponding billing period in <year1>.

(6) Meters serving mixed uses: An allotment to be determined by the <title of designated official> based upon the criteria contained in items (1) through (5) immediately above.

(h) Any customer exceeding their allotment, based on metered billing records, shall be billed and required to pay a penalty of $X7 for each 1,000 gallons of such excess. This penalty charge shall be waived for the first bill received after Stage 3 is implemented and shall terminate the day the suspension period ends.

(i) If a connection to the <City/District> system was not in existence or used in <year1>, the <City/District> will estimate use in such year based on other historic records and/or water use by customers having similar end uses.

(j) The <title of designated official> may increase or decrease the allotment for any customer if he determines that special circumstances exist and that to do so would better achieve equity in allocation of available water or better meet health and safety concerns.

Section 8. Signs on Lands Supplied from Private Sources

The owner or occupant of any land within the water service area of the <City/District> that is

supplied with water from a source not owned or operated by the <City/District> (such as a well, spring or legal surface diversion) which is used to irrigate landscape which is visible to the general public, will be requested to post and maintain in a conspicuous place thereon a sign furnished by the <City/District> giving public notice of the private supply.

Section 9. Use of Sprinklers Conditional

(a) Any customer of the <City/District> may use sprinklers to apply water furnished by the <City/District> to irrigate any turf grass, garden, landscaped area, trees or shrubs provided said application is properly controlled and performed in a non-wasteful and efficient manner confined to the nighttime hours of 7:00 p.m. and 9:00 a.m. of the next day. In the event low pressure micro-jet sprayers are present in a drip system, irrigation by the valve(s) controlling same shall also be confined to the nighttime hours noted above.

(b) The amount of water normally applied for landscape irrigation shall not exceed X3%. This condition shall not apply to residential customers if Stage 3 allotments are implemented.

(c) In determining the amount of water to apply to turf grass, customers are encouraged to use the following formula:

Applied water for turf grass (gallons) = Area of turf grass (square-ft)
x ETo (inches for a given period of time - typically 3 to 7 days)
x ETo Adjustment Factor of X8%
x conversion factor of 0.62

The ETo Adjustment Factor is based on the assumption that overall irrigation efficiency is 65% and that the crop coefficient for turf grass is 0.8. Use of this formula to determine applied water will yield the appropriate amount of water to apply while rationing is in effect.

(d) Water applied by sprinklers shall be applied in short enough cycles to avoid run-off to gutters and drains.

(e) During the suspension period, use of water by sprinklers is a privilege and permission to use water in this way may be withdrawn if it comes to the attention of the <title of designated official> that such use by a given customer is wasteful or in excess of the amount determined in Section 8 (b). A common result of wasteful application of water by sprinklers is evidence of run-off to a gutter.

Section 10. Variances

(a) Any customer of the <City/District> may make written application for a variance. Applications shall be addressed to:

<title of designated official>
<address of City/District>

Said application shall describe in detail why applicant believes a variance is justified. The <title of designated official> may grant a variance to permit a use of water otherwise prohibited by this ordinance, if he determines that failure to do so would cause:

(1) an emergency condition affecting the health, sanitation, fire protection or safety of the applicant or public; or

(2) an unnecessary and undue hardship on the applicant or the public, including but not limited to, adverse economic impacts, such as loss of production or jobs.

(b) The decision of the <title of designated official> to deny an application for variance under this section may be appealed to the <City Council/Board of Directors> by submitting a written appeal to the <City/District> within fifteen (15) calendar days of the date of the decision. Variances granted by the <City Council/Board of Directors> shall be prepared in writing and contain any conditions imposed by the <City Council/Board of Directors> in granting said variance. The City Council/Board of Directors> may require the variance be recorded at applicant's expense.

Section 11. Enforcement and Fees

(a) During Stage 2 or 3, should the <title of designated official> become aware of any violation of any provision of this ordinance, the following enforcement procedure shall be undertaken:

(1) For the first such violation, the customer shall be given a warning, generally by phone or directly in person by a <City/District> employee, or by leaving a door tag notice informing the customer of the problem and asking that it be corrected.

(2) If the violation continues or is repeated, a certified letter shall be mailed to the customer who receives the water bill. Said letter shall describe the violation and request that it be corrected, cured and abated immediately or within such specified time as the <title of designated official> determines is reasonable under the circumstances. Said letter shall state the consequences of non-compliance with the request.

(3) If the violation continues, the <title of designated official> may forthwith order disconnection of the service where the violation occurs.

(b) Before reconnection of a service, the customer must stop the violation, pay all past due charges on the account, and pay a Violation Reconnection Fee.

(c) If, during the suspension period, a water service is disconnected twice because of

violation of this ordinance, a flow restriction device may be installed by the <City/District> before service is reconnected. Furthermore, the customer must stop the violation, pay all past due charges on the account, and pay a Second Violation Reconnection Fee. If a flow restriction device is installed, the <City/District> shall remove same after expiration of the suspension period.

(d) If, during the suspension period, a water service is disconnected more than twice because of violation of this ordinance, a flow restriction device shall be installed by the <City/District> before service is reconnected. Furthermore, the customer must stop the violation or agree to stop the violation, pay all past due charges on the account, and pay a Subsequent Violation Reconnection Fee for each such instance.

(e) It shall be unlawful for any customer to willfully tamper with or in anyway modify or attempt to modify a <City/District> meter or anything within the <City's/District's> meter box. Violation shall result in customer being charged a Meter Tampering Fee plus the cost of labor and materials to remedy any damage caused to the <City's/District's> equipment as a result of such tampering.

(f) Anyone who willfully takes water from the <City/District> water system without the <City's/District's> permission or who willfully tampers with or causes damage to any <City/District> meter or water system appurtenance is liable to the <City/District> in the sum of $500, as a civil penalty, for the first such act and $1,000, as a civil penalty, for each subsequent act during the suspension period. This sum shall be recoverable by civil suit in a court of competent jurisdiction. This section does not limit the <City's/District's> right to recover the cost of any <City/District> water taken without the <City's/District's> permission.

(g) All customer fees required by this section shall be set by a resolution of the <City/District>.

Section 12. Severability

If any section, subsection, sentence, clause, phrase, or word of this ordinance is for any reason held to be invalid, the validity of the remaining portion of this ordinance shall not be affected.

Section 13. Effective Date

This ordinance shall become effective upon its adoption.

Section 14. Publication

Within ten (10) days after its adoption, this resolution shall be published pursuant to Section 6061 of the Government Code in full in a newspaper of general circulation that is printed, published, and circulated in the <City/District>. If there is no such newspaper the resolution shall be posted within ten (10) days after its adoption in three public places within the <City/District>.

ω ω ω ω

I hereby certify that the foregoing is a true and complete copy of an ordinance duly and regularly adopted by the <City/District>> at a regular meeting thereof held on <date> by the following vote:

Ayes:
Noes:
Absent:
Abstained:

(SEAL)

_____

Secretary
<City/District>>

Model Rationing Ord - Draft 5.wpd

Model Rationing Ordinance (9/1/00)

Step by Step Instructions for Determining Values for Model Rationing Ordinance

Step	Variables*	Instructions**	
Step 1	X1	Footnote 1: Follow the steps in this footnote to determine the overall mandatory rationing requirement. Enter in footnote box. This calculation needs to be revisited in early February of each year in the case of a prolonged drought.	
Step 2	year 1	Determine base year you want to compare to. This is usually taken to be the last year before drought.	
Step 3		Footnote 3: From Table 3, determine additional reduction factor for irrigation meters for your service area and enter in footnote box.	
Step 4		Footnotes 4 & 5: Determine amount of "lesser rationing" to be required of CII customers. Go to Footnote 4 and 5 and enter in the boxes. Strongly suggest all contractors agree and use same values. Suggested values are 10% for CII (except healthcare and public safety) and an additional 5% for healthcare and public safety.	
Step 5		Footnote 6: Obtain average single family per capita use value for your service area from Table 4 and enter in footnote box.	
Step 6		Footnote 9: Examine and accept/change default values suggested for irrigation efficiency and the crop coefficient for grass.	
Step 7	X2 -> X8	Table 1 will have automatically loaded your choices and calculate X2 through X8 values. Select values rom the appropriate colunm of Table 1 and enter into Ordinance.	
Step 8	Dates	Determine dates for Ordinance.	
	date1	Date Ordinance is adopted	
	date2	Date of hearing on Ordinance	
	date3	Date contained in Water Waste Ordinance which you have already adopted.	
	date4	Same as Date 1 unless you desire to set a later date to assure notice to pool owners.	
	date5	Date Stage 2 Mandatory Rationing is to commence.	
Step 9	Fees	Determine following customer fees to be adopted by Resolution. Suggested values are:	
		Violation Reconnection Fee (Section 11 (b))	$100
		Second Violation Reconnection Fee (Section 11 (c))	$200
		Subsequent Violation Reconnection Fee (Section 11 (d))	$400
		Meter Tampering Fee (Section 11 (e))	$500

* All variables need to be determined and recommended to the City Council/District Board of Directors before adoption of he Ordinance.
** All footnote references pertain to Table 1.

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Table 1 - Rationing Model
(Inserts Suggested for Model Rationing Ordinance)

Description	Code	Note	Overall Mandatory Rationing Requirement "X1" (1), %								
			25%	30%	35%	40%	45%	50%	55%	60%	65%
Not-to-Exceed Limits:											
Residential meters, %	X2	2	75%	70%	65%	60%	55%	50%	45%	40%	35%
Additional reduction factor for irrigation meters		3	17%	17%	17%	17%	17%	17%	17%	17%	17%
Irrigation Only meters, %	X3	4	59%	54%	49%	44%	39%	34%	29%	24%	18%
Non-residential meters (except for Healthcare & Safety), %	X4	5	85%	80%	75%	70%	65%	60%	55%	50%	45%
Healthcare and Public Safety, %	X5	6	90%	85%	80%	75%	70%	65%	60%	55%	50%
Per capita component of residential allotment											
Without Rationing, gpcd		7	136	136	136	136	136	136	136	136	136
With Mandatory Allotment Rationing, gpcd	X6	8	102	95	89	82	75	68	61	55	48
Stage 3 Exceedance Penalty, $ per 1,000 g	X7	9	$0.50	$1.06	$1.63	$2.19	$2.75	$3.31	$3.88	$4.44	$5.00
ETo Adjustment Factor, %	X8	10	48%	43%	39%	35%	31%	27%	23%	19%	15%

Definitions:

afa = acre-feet per annum
gpcd = gallons per capita per day
g = gallons
IE = irrigation efficiency
Kc = crop coefficient
mg = million gallons
mgd = millions of gallons per day
ETo = reference evapotranspiration in inches (available from local CIMIS station)
CIMIS = California Irrigation Management Information Service
CII = commercial, institutional and industrial use
SF = single family detached dwelling unit

Notes to Table 1:

1 Expressed as the percentage reduction in use from a previously designated year (year1). Value may change in second and subsequent years of a prolonged water shortage emergency. Do following steps to calculate Overall Mandatory Rationing Requirement and insert as "X1" in box.

		Units*	
Step 1	a Total Requirement		
Step 2	b Supply available from SCWA		<Determined by SCWA pursuant to Sec. 3.5 of Water Supply Agree.
Step 3	c Sustainable Local Supply (obtain from Table 2)		
Step 4	d = b + c = Total Supply		
Step 5	e = a - d = Deficit		
Step 6	e/a = Overall Mandatory Rationing Requirement = X1 =		%

Step 7 Now find column with nearest corresponding value in Table 1 to determine other Ration Values (X2 through X8) for Model Ordinance.

* afa or mg or mgd based on average day of year demand

2 Compared to a prior year (year1) or similar billing period in a prior year. The prior year could be the last year that normal supply conditions existed, etc. This percentage is the maximum level that use in the current period should reach and still be in compliance with the overall mandatory rationing limit.

3 Since CII is allocated more water, irrigation only meters must take up the slack. The reduction factor is calculated in Table 3 and entered here: 16.5%

4 Irrigation only meters serve predominantly irrigation purposes. The applicable not-to-exceed factor is = X2 - the irrigation meter reduction factor.

5 Not-to-exceed percentage that applies to non-residential use (CII customers). Does not include irrigation only use or healthcare and public safety use. It is more difficult for CII customers to conserve without incurring economic impacts. An additional allowance of 10% is provided these customers.

6 Not-to-exceed percentage for meters serving healthcare and public safety uses is increased an added 5% compared to other CII customers to accommodate these vital public service customers.

7 From Table 4, enter per capita use of typical SF detached home customer in your service area here: 136 For the purposes of this spreadsheet, the median value for all Water Contractors based on currently best available data has been used as the default value.

8 This is the net allotment available to SF accounts. It is calculated by multiplying normal per capita demand times the not-to-exceed limit for Residential customers.

9 Applied to each 1,000 gallons of use exceeding allotment during Stage 3. The penalty rate amount was selected to about double the annual cost of water at the 50% rationing level should a customer fail to conserve.

10 This is factor (percentage), when multiplied times ETo yields average amount of water to apply per square foot of irrigated turf grass. The exact formula to obtain the amount of allowable water to apply in gallons per sq-ft of irrigated turf is: ETo Adjustment Factor x ETo x 0.623

Where:

ETo is expressed in inches and is obtained from a local CIMIS station or hot-line.

0.623 = 7.48 gallons/cu-ft / 12 inches/ft, a conversion factor to yield gallons per sq-ft

The ETo Adjustment Factor is calculated from the equation: X3 x IE / Kc

Where:

IE = overall irrigation efficiency = 65%

Kc = crop coefficient for cool season grass = 0.8

Table 2 - Sustainable Local Supply Capability Available to Deploy During a Drought

Contractor	Sustainable Peak Month (1) mgd	Annual Local Supply Capability afa
Cotati	0.40	
Petaluma	1.60	
Rohnert Park	3.90	
Sonoma	0.80	
Forestville	0.00	
North Marin	4.00	
Santa Rosa	0.00	
Valley of the Moon	0.70	
Other Agency Customers	0.00	
Total	11.40	

Notes

1 From MOU re Interim Impairment, August, 2000

Table 3 - Calculation of Additional Reduction for Irrigation Only Meters (1)

		Percentage									
	Notes	Median (2)	Cotati	Pet.	RP	Son.	FWD	NMWD	SR	VOM	Other
Compared to Total Sales:											
Fraction of CII use (a)	3	15%									
Fraction of healthcare and public service use (b)	4	3%									
Fraction of Irrigation only use (c)	5	10%									
Rationing Reductions (breaks):											
CII (except healthcare and public safety) (d)		10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Added break for Healthcare and public safety (e)		5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Additional reduction factor for irrigation meters	6	17%									

Notes:

1 This is necessary to offset the lesser rationing required of CII and Healthcare and public use.

2 JONWRM's estimate. Best for each City/District to develop own values for items a, b, and c. Values for d and e are taken from Footnotes 5 and 6 respectively in Table 1

3 Includes healthcare & public safety and excludes irrigation only meters. From annual sales records.

4 From annual sales records (exclude irrigation only meters)

5 From annual sales records

6 Additional not-to-exceed adjustment for irrigation only meters to be subtracted from the not-to-exceed limit for irrigation only meters (X3) is found from the following formula: (a * d + b * e) / c

Table 4 - Per capita Use (Best Data Available)
Residential Single Family Detached Homes

Contractor	Avg Use/yr gpd/account	Household Population	Per capita gpcd	Notes
Cotati	343	2.49	138	1a, 2a
Petaluma	339	2.65	128	1c, 2b
Rohnert Park	360	2.65	136	1c, 2b, 3
Sonoma	315	2.12	149	1b, 2c
Forestville	341	2.45	139	1c, 2b, 4
North Marin	346	2.63	131	1c, 2b, 5
Santa Rosa	287	2.52	114	1c 2b
Valley of the Moon	290	2.12	137	1b, 2c, 6
Windsor	384	2.96	130	1c 2b
Other Agency Customers	341	2.45	139	7
Average			134	
Median			136	

Notes:

Source of gpd estimates:

1a Water and Wastewater Avoided Cost Study, Montgomery Watson, Sept. 1995
1b Water Rate & Connection Charge Study for City of Sonoma by JONWRM
1c Cost of Service Study, JONWRM August 3, 2000

Source of household population estimates:

2a Department of Finance, CityCounty Population and Housing Statistics, Jan 1992
2b Department of Finance, CityCounty Population and Housing Statistics, Jan 1999
2c Department of Finance, CityCounty Population and Housing Statistics, Jan 2000

Note: DOF household pop. estimates are averages for occupied single family and multi-family units.

Other Notes:

3 Use estimated by Joe Gaffney, City Engineer
4 Household population assumed same as Sebastopol
5 City of Novato household population
6 Household population assumed to be same as City of Sonoma
7 All values assumed to be same as Forestville Water Dist.

ATTACHMENT 2

Allocation Model

Description of Model that Calculates the
Allocation of Water Available to Sonoma County Water Agency for its Customers*
During a Water Supply Deficiency Taking Demand Hardening into Account

April 4, 2006 Version

This EXCEL workbook (040406 Allocation Model.xls) presents two models that calculate allocations to Sonoma County Water Agency (SCWA) Customers during a shortage of water supply in the Russian River. The calculations meet all of the requirements of the Restructured Agreement for Water Supply (Agreement). See **Contents** sheet for layout of sheets in the workbook. Another EXCEL workbook (040406 Customer Water Use.xls) supports this workbook and contains data compiled for the 2005 Urban Water Management Plan.

* "SCWA Customers" or "Customer" is defined as any of the following:
Regular Customers
Water Contractors (sometimes referred to as "Primes"): Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Windsor (Airport Service Area), North Marin Water District, Valley of the Moon Water District
Other Agency Customers: SCWA, County of Sonoma, Larkfield Water District, Forestville Water District, Lawndale Mutual Water Co., Kenwood Village Water Co., Penngrove Water Co., City of Sebastopol, State of California, and Santa Rosa Jr. College)
Marin Municipal Water District (MMWD)
Russian River Customers (Customers of SCWA that divert water directly from the Russian River or via wells adjacent to the River).

Where to Find Results:

Results for allocating water during a shortage given varying assumed amounts of water available to SCWA in the Russian River are modeled for two cases.

- The **Current Model** is to be employed during a real drought. Inputs to this model must be updated to then current conditions. For current conditions, results are shown on the **Current Recap** sheet.

- The **Future Model** is a "planning" model whose purpose is to predict allocations for various levels of deficiency in the future when all Customers are assumed to have reached there entitlement limits – generally about 20 years from now for most Customers. (Note: This was the type of model prepared by West, Yost & Associates for the City of Santa Rosa and is also the type prepared by Petaluma.) Results are shown on the **Future Recap** sheet.

Required Allocation Methodology:

Section 3.5(a)(3) of the Agreement provides for allocation of water in the event of a water supply deficiency as follows:

- "**First**", Allocation of quantities of water required by each Customer* for human consumption, sanitation and fire protection (HC, S & FP) after taking into consideration all other sources of potable water then available to said customer. (Section 3.5(a)(3)(i)) (Often referred to as Tier 1.)

- "**Second**", Allocation of any additional water available to the SCWA proportionately to its Customers* as follows (Section 3.5(a)(3)(ii)) (Often referred to as Tier 2 allocation.):

  Regular Customers (Water Contractors and Other Agency Customers): Deliveries from aqueduct based on respective average daily rate of flow during any month entitlements. These entitlements are set forth as million gallon per day (mgd) rates in Sections 3.1(a) and 3.2 of the Agreement.

  Russian River Customers: Authorized diversions or rediversions of water based on delivery limits set forth in agreements with the SCWA.

  Marin Municipal Water District (MMWD): Deliveries based on Third Amended Offpeak Agreement and Agreement for Sale of Water (as amended on Jan 25, 1996), and amendments or subsequent agreements between the SCWA and MMWD that have been approved by the Water Advisory Committee.

- **Sum of Two:** The Agreement further requires that the sum of the "First" plus "Second" allocation for a given SCWA Customer not exceed the Reasonable Requirement or entitlement limit/contracted amount, whichever is less (Section 3.5(a)(3)(iii).

"Human Consumption, Sanitation and Fire Protection" Definition:

In determining HC, S & FP amounts, the Agreement provides that SCWA shall take into account the level of water conservation achieved by the Customer and the resulting decrease in end user ability to reduce water use (the hardening of demand) resulting from such conservation. The allocation shall be determined using a methodology which rewards and encourages water conservation; avoids cutbacks based upon a percentage of historic consumption, and, among other things, bases the amounts necessary for HC, S & FP upon no greater than average indoor per capita water use determined from recent retail billing records for winter water use by all of the Water Contractors; and, if necessary or appropriate for equitable purposes, considers commercial, industrial and institutional water uses separately and determines that element of the allocation based on winter water use from recent retail billing records for commercial, industrial and institutional uses. (Section 3.5(c)(1))

"Reasonable Requirements" Definition:

The Agreement states that the fundamental purpose of the Reasonable Requirements limitation is to ensure that no Customer receives more water during a shortage than that Customer reasonably needs. In determining reasonable requirements, the SCWA may take into account the hardening of demand resulting from the level of conservation achieved by the Customer; the extent to which the Customer has developed recycled water projects and local supply projects, and the extent to which the Customer has implemented water conservation programs. The Agreement further states that it is the intention of the

parties that the SCWA make its Reasonable Requirements determinations so as to encourage Customers to implement water conservation, recycled water, and local supply projects. (Section 3.5(c)(2))

Description of Models:

Two models are presented.

- **Current Model:** The Current Allocation Model determines annual allocations based on the assumption the water supply deficiency occurs now and impacts current conditions and levels of use. This is the model that would be used in the event of an actual deficiency in water supply available from the Russian River. It employs estimates of HC, S & FP needs, Reasonable Requirements, and Local supply. In the event of a real perceived water supply deficiency, inputs to the model must be updated to then currently available data. If the shortage persists longer than one year the inputs must again be updated – particularly local supply estimates which should be updated every year of the drought. Customers relying on surface water for local supply, such as North Main Water District, and MMWD, can be expected to have reduced local supply available.

- **Future Model:** The second model is hypothetical and predicts future allocations at a point in time that assumes that all customers of the SCWA have reached their annual entitlement limits. It sets the Reasonable Requirement for each SCWA Customer to that customer's annual entitlement limit (cap). The Future Allocation Model is useful for planning purposes to predict allocations from the SCWA for various assumed water supply deficiencies.

Model Assumptions and Inputs:

1. **Entitlements:** Entitlements (Regular Customers) and contracted amounts (MMWD and Russian River Customers) for both models are as set forth in the Agreement and existing agreements between the SCWA and MMWD and its Russian River Customers. (See **Entitlements** and **RR Cust** sheets.)

2. **Local Supplies:** The estimates of safe yield of local supplies are the same for both models and are based on estimates reported by Water Contractors to West, Yost & Associates in a September 23, 2004 Tech. Memo to the City of Santa Rosa and are generally average local supply that was available for the period 2000 through 2003. A contingency factor is applied by John Olaf Nelson Water Resources Management (JONWRM) to each local supply to account for equipment/maintenance issues or other potential problems. This factor was assumed to be 10% for each Waster Contractor for lack of better data. The safe yield value for MMWD was supplied by MMWD. Local supply estimates for Other Agency Customers were not available and was assumed to be "0". Information on Local supplies needs to be accurately determined and updated by the SCWA. (See **Local** and **TM Data** sheets.)

3. **Water for Human Consumption, Sanitation and Fire Protection:** Water needed to meet HC, S & FP needs for both models is assumed to be equal to total winter level demand of customers served by Customers of the SCWA and is based on metered water sales (billings) for calendar 2004, the base year analyzed in the 2005 Urban Water Management Plan. Winter level demands are then extrapolated to a full year to determine the annual HC, S & FP need. Water available

from local supplies is then determined and net HC, S & FP needs determined in order to calculate the "First" allocation. In determining the "First" allocation, demand hardening is accounted for using winter level per capita demand. (See **GPCD** and **Human** sheets and the footnotes on the Current Model for details.)

4. **Reasonable Requirements:**

- For the Current Model, Reasonable Requirements were assumed to equal average annual aqueduct deliveries to SCWA's Regular Customers and MMWD for FY 2003-04 and FY 2004-05. For Russian River Customers, the average for Water Years 2004 and 2005 was used, as that was the format the data was available in. (Use of a three or four year average would normally be a better choice for calculating Reasonable Requirements, however, this was not done as at least one SCWA customer made a significant policy change in aqueduct usage which would not have been fairly reflected if years prior to FY 2003-04 were used. Also in subsequent analyses, the data should be normalized to common annual periods.) (See **Reasonable** sheet.) Pursuant to Section 3.5(c)(2), Reasonable Requirements were adjusted with a demand hardening factor to account for differing levels of conservation achieved by Customers. The demand hardening factor is derived from total per capita demand (residential, non-residential and unaccounted for water) as determined for the base year (cal. 2004) of the 2005 Urban Water Management Plan. (See **DH Factor** sheet.)

- In the Future Model, Reasonable Requirements are set equal to annual entitlement limits (caps) or contract limits as applicable, it being assumed that each Customer has reached its annual entitlement limit (the same approach taken in the Santa Rosa and Petaluma models). THIS IS THE ONLY INPUT DIFFERENCE BETWEEN THE "CURRENT" AND "FUTURE" MODEL.

Model Design and Workbook Layout:

The two model sheets are totally independent and are designed to automatically calculate water shortage allocations for any SCWA available supply bounded by a low value equal to the sum of water required for HC, S & FP and an upper value equal to the sum of Reasonable Requirements or sum of annual entitlement limits, whichever is less. Cells in both models are linked to the various supporting data sheets.

To operate a model, simply input the assumed available supply in Cell H:4 of the model you are working with. The results – the sum of the "First" (Tier 1) plus "Second" (Tier 2) allocation appear to the far right (Column 42 of the Current Model and Column 39 of the Future Model).

The Current Model sheet is followed by a sheet entitled "Current Recap" that shows the resulting allocations (both in tabular and graph form) for each Customer for various assumed levels of available supply. This recap and the graphs are automatically populated by running the Macro entitled "CurRecap".

Likewise, following the Future Model sheet is a sheet entitled “Future Recap” which shows the tabular and graph results for the Future Model. This recap and the graphs are automatically populated by running the Macro entitled “FutRecap”.

Caution Concerning Data Collection and Maintenance:

With the allocation methodology introduced in the Agreement, it is essential that the SCWA develop and maintain a data base containing information collected from all of its Customers based on application of uniform standards, and containing data on water service area population, portion of population served by private wells (none of the models correct for private well water use by service area population), winter level water consumption, annual consumption, local supplies, unaccounted for water, conservation, recycled water use, etc. Good regional data on evapotranspiration differences may also be needed to modify the Reasonable Requirement demand hardening adjustment factor. A fair and uniform way to determine the safe yield of local supply capacity is especially important. It may be useful to categorize local supply into: (1) normally available and used capacity, and (2) strictly standby capacity that is more expensive to use than aqueduct water or has some non-threatening quality issues, i.e. taste and odor that make it undesirable to use under normal water supply conditions.

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Contents of this EXCEL Workbook
Water Shortage Allocation Model w. Demand Hardening Factor (a)
April 4, 2006 Version

Models (Current and Future)

Input Data for Models

* Same data used in both Current and Future Model.

** Based on aqueduct sales and Russian River diversions in recent non-drought years. In the Future Model, reasonable requirements are set equal to annual entitlement limits (caps) or contract delivery limits as applicable in order to estimate allocations at that time in the future when demand has grown to equal the annual entitlement limits.

For questions, contact:

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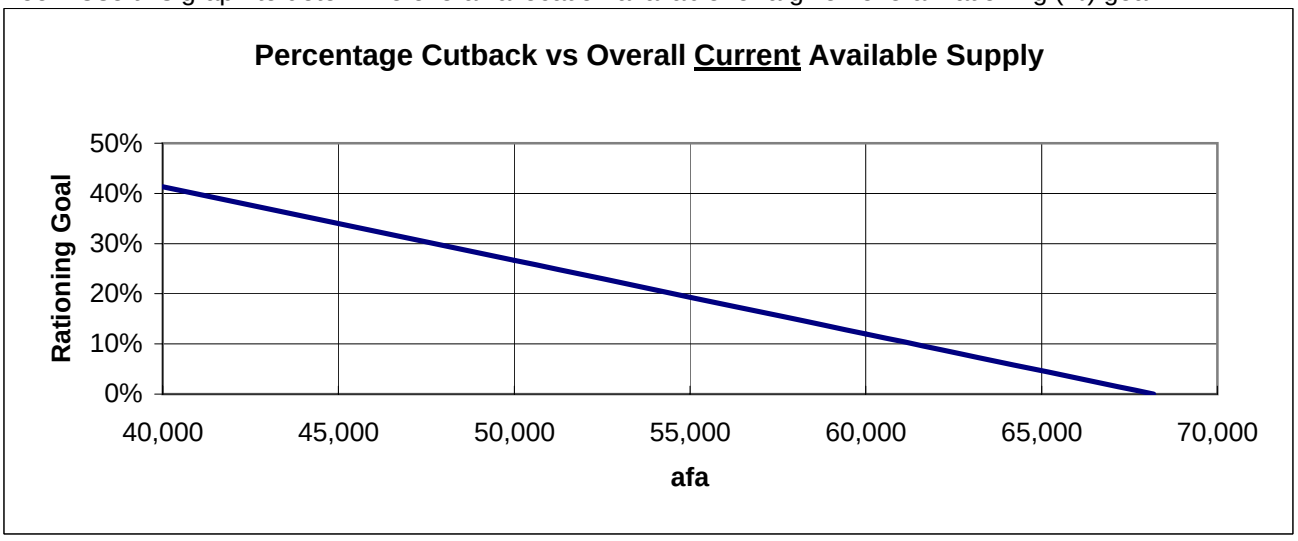
Results for Current Allocation Model vs. Assumed Available Supply

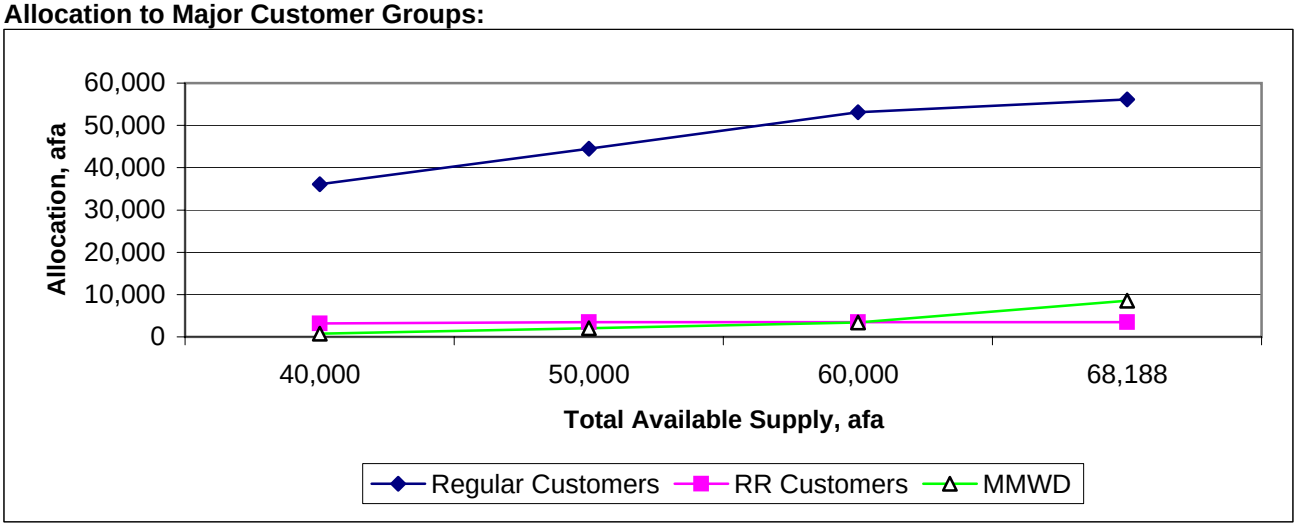
Available RR SCWA Supply, afa >	**40,000**	**50,000**	**60,000**	**68,188** *
Equivalent Cutback in Deliveries >	**41.3%**	**26.7%**	**12.0%**	**0.0%**
Regular Customers				
Cotati	694	928	1,095	1,095
Petaluma	6,155	7,501	8,952	9,735
Rohnert Park	2,924	3,850	4,849	5,246
Sonoma	1,261	1,650	2,069	2,200
Windsor	317	409	410	410
NMWD	4,775	6,004	7,328	8,459
Santa Rosa	16,856	20,351	24,118	24,737
VOM	2,157	2,682	3,086	3,086
Other Agency	949	1,116	1,207	1,207
Sub-Total	36,088	44,491	53,114	56,173
MMWD	737	2,014	3,391	8,520
Russian River Cust's	3,175	3,495	3,495	3,495
Total	**40,000**	**50,000**	**60,000**	**68,188**

* Note: Max. Value is capped at 68,188 afa as this satisfies sum of Reasonable Requirements.

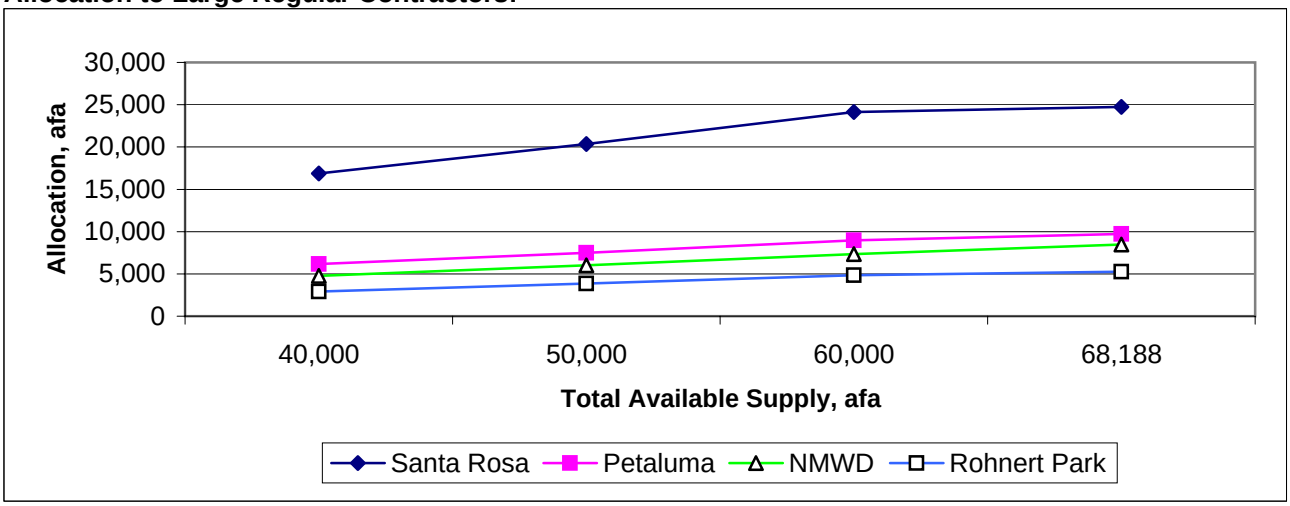
Tool: Use this graph to determine overall allocation available for a given overall rationing (%) goal.



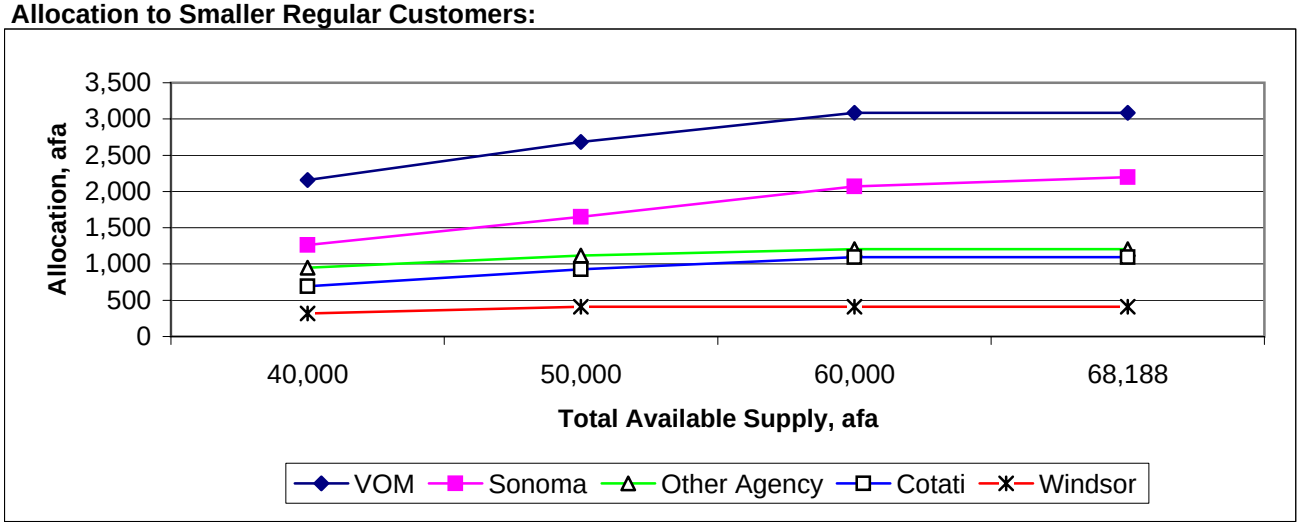
Allocation to Major Customer Groups:



Allocation to Large Regular Contractors:

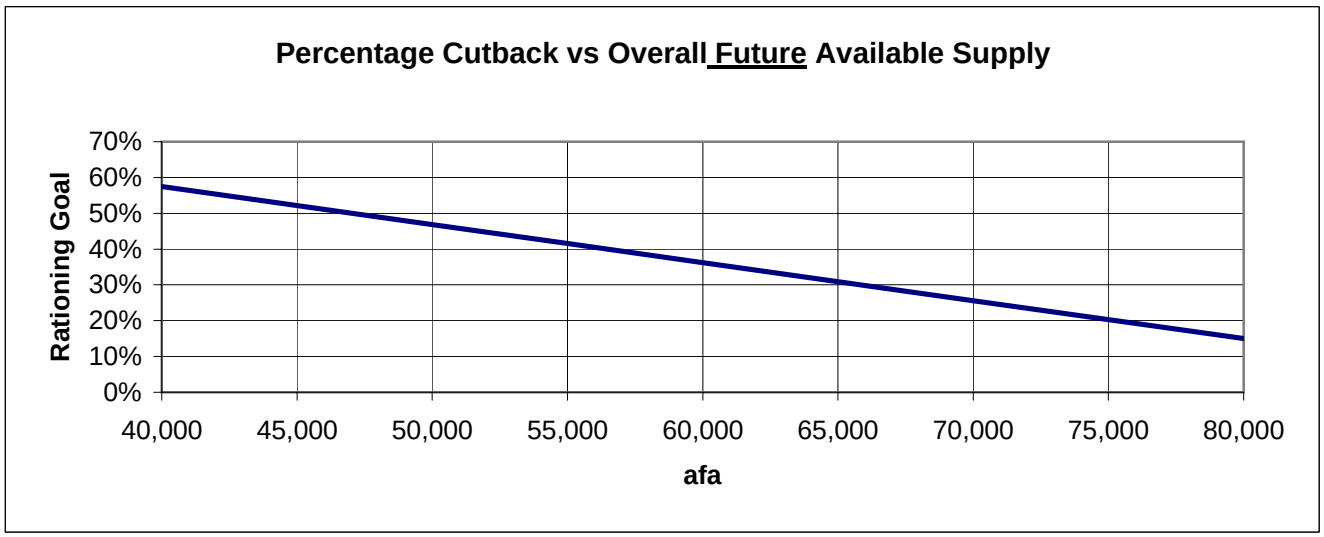


Allocation to Smaller Regular Customers:

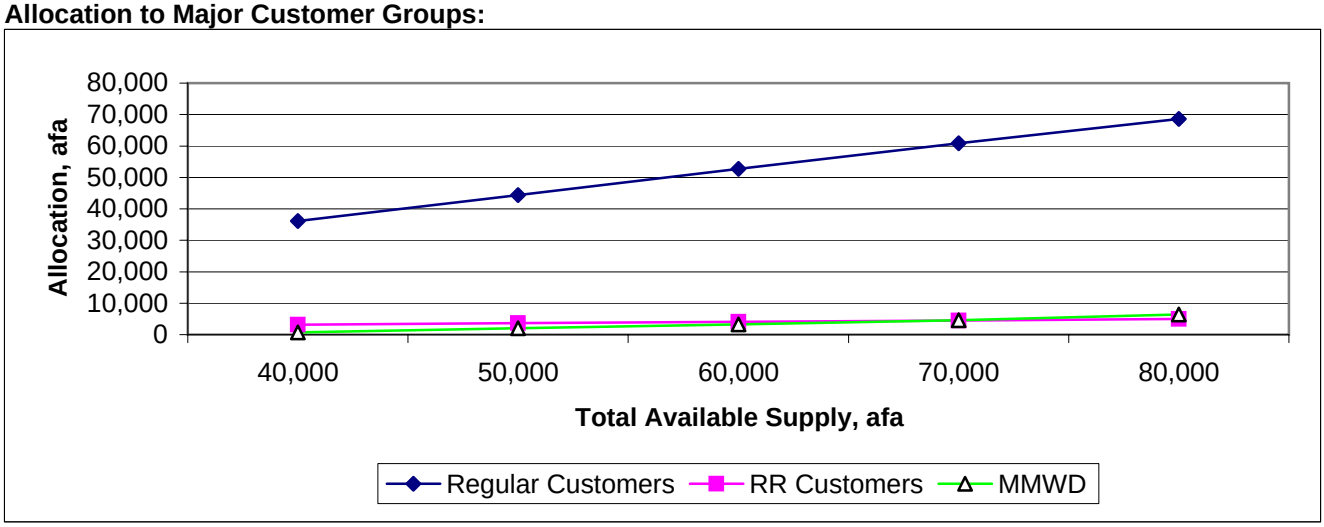


Results for Future Allocation Model vs. Assumed Available Supply

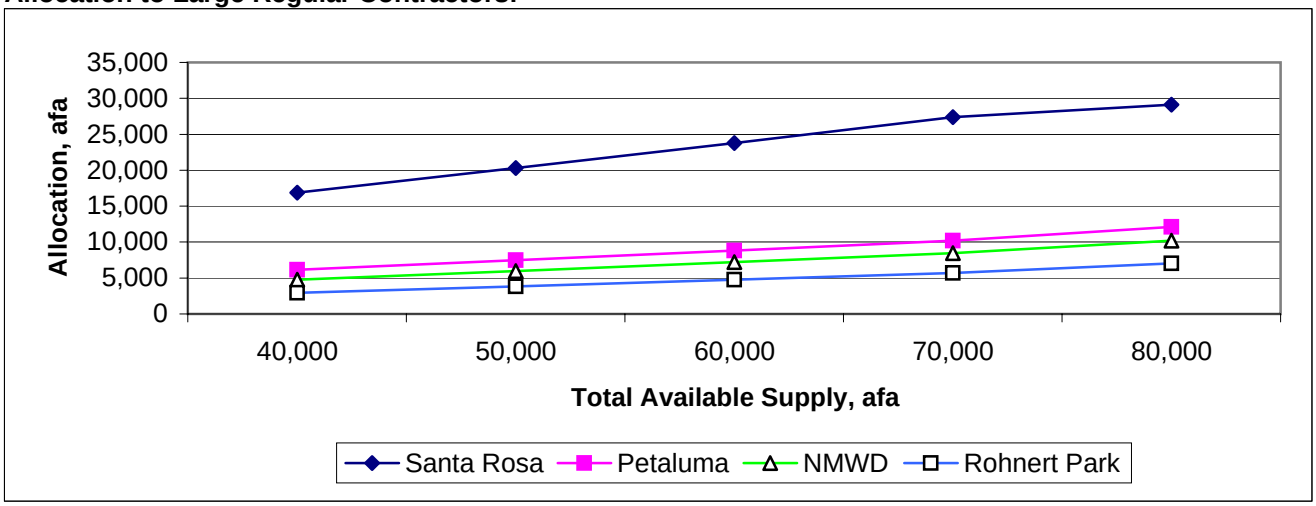
Available RR SCWA Supply, afa >	**40,000**	**50,000**	**60,000**	**70,000**	**80,000**
Equivalent Cutback in Deliveries >	**57.5%**	**46.9%**	**36.2%**	**25.6%**	**15.0%**
Regular Customers					
Cotati	694	925	1,157	1,401	1,520
Petaluma	6,155	7,484	8,813	10,214	12,118
Rohnert Park	2,924	3,838	4,753	5,716	7,027
Sonoma	1,261	1,645	2,029	2,433	2,984
Windsor	317	408	500	596	727
NMWD	4,775	5,988	7,201	8,480	10,218
Santa Rosa	16,856	20,306	23,756	27,393	29,100
VOM	2,157	2,675	3,193	3,200	3,200
Other Agency	949	1,113	1,278	1,451	1,687
Sub-Total	36,088	44,384	52,680	60,884	68,581
MMWD	737	1,998	3,259	4,587	6,394
Russian River Cust's	3,175	3,618	4,061	4,528	5,025
Total	**40,000**	**50,000**	**60,000**	**70,000**	**80,000**



Allocation to Major Customer Groups:



Allocation to Large Regular Contractors:



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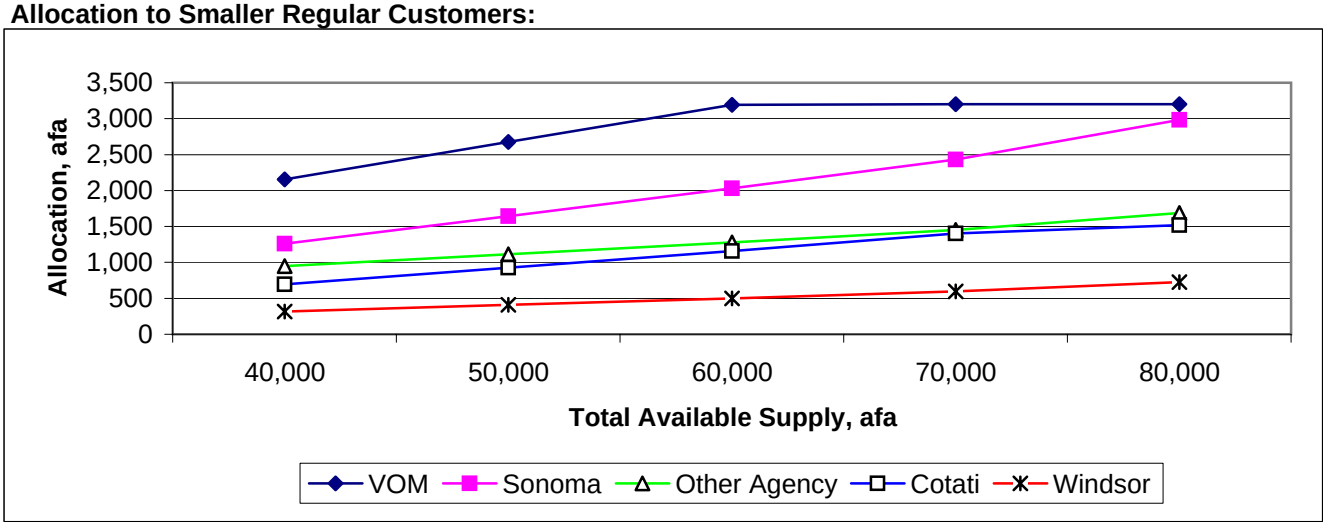


Entitlements of SCWA Customers

SCWA Customer:	Source	Entitlement mgd (any month)	Annual Limit afa
Regular Customers			
Cotati	a	3.8	1,520
Petaluma	a	21.8	13,400
Rohnert Park	a	15	7,500
Sonoma	a	6.3	3,000
Windsor (Airport Service Area)	b	1.5	900
North Marin WD	a	19.9	14,100
Santa Rosa	a	56.6	29,100
Valley of the Moon WD	a	8.5	3,200
Other Agency Cust (Includes FWD)	c	2.7	2,048
Sub-Total		136.1	74,768
Marin Muni. WD	d	0	14,300
Russian River Customers	e	0	5,025
Total		136.1	94,093

Notes:

a Eleventh Amended WS Agree. (Proposed Restructured WS Agree is same)

b Proposed Restructured WS Agree. Applies only to Airport Service Area served from SCWA Aqueduct. Windsor's direct diversions from the RR are covered by an Agreement with the SCWA and potentially via its pending application to the State for Water Rights

c "mgd any month" limit is per Eleventh Amended WS Agree. (Proposed Restructured WS Agree is same). Annual limit is estimated based on avg. annual Other Agency Customer demand (as defined in Restructured Agree) for FY's 2003 and 2004 (1,356 af) projected through 2020 assuming a 2% per year increase for anticipated growth plus a 10% contingency.

d Second Amended WS Agree and Agree for Sale of Water as Amended by The Supplemental WS Agree dated Jan 25, 1996. Note: Annual deliveries are subject to certain prior year minimum purchase provisions. Deliveries are subordinate to Regular Customer Entitlements.

e Various Agreements between SCWA and each of its RR Customers (refer "RR Cust" sheet)

Russian River Customers of SCWA

Entitlements of RR Customers

Source: Chris Murray, SCWA, 3/3/05

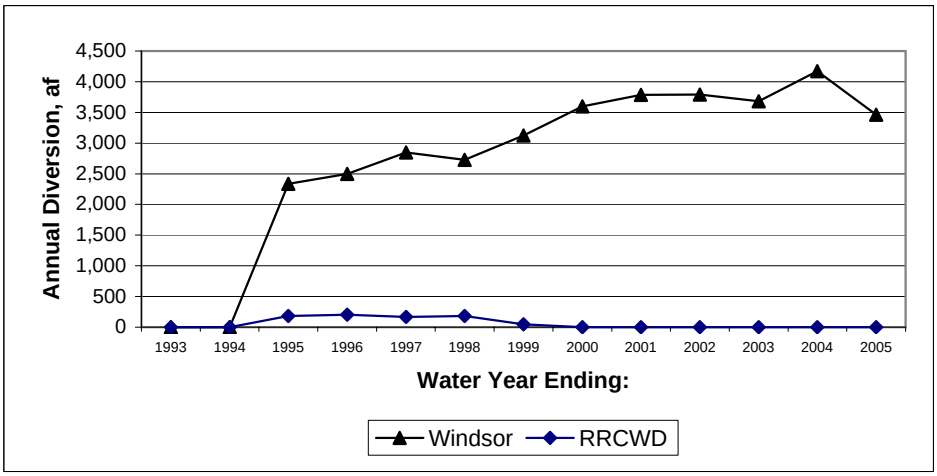
Contractor	Date	Max Diversion Limit, afa	Comments
Currently Approved Points of Diversion *:			
Town of Windsor **	1/8/1991	4,725	Windsor has application pending for its own water rights
Russian River Co. WD	3/14/1991	300	
Sub-total		5,025	
No Points of Diversion Approved*			
City of Healdsburg	11/17/1992	4,440	Healdsburg holds own water rights for other points of diversion
Camp Meeker Parks & Rec. Dist.	7/9/1996	90	
Occidental CSD	4/23/2002	65	
Redwood Valley Co. WD	Pending	?	Agreement pending
Sub-total		4,595	
Potential Total		9,620	

* As pertains to SCWA's water rights.
** Direct diversions via wells situated near the Russian River.

Historic Diversions from the RR, af

Source: Chris Murray, SCWA, 2/15/06 (SCWANTS.xls)

W Yr	RRCWD	Windsor	Total
1993	0	0	0
1994	0	0	0
1995	182	2,337	2,519
1996	203	2,496	2,699
1997	166	2,848	3,013
1998	183	2,728	2,911
1999	47	3,124	3,171
2000	0	3,596	3,596
2001	0	3,786	3,786
2002	0	3,789	3,789
2003	0	3,684	3,684
2004	0	4,173	4,173
2005	0	3,465	3,465
Avg of W Yr's 2004 & 05			3,819
Avg of last 3 W Yrs			3,882



Note: Water Yr extends from Oct 1 through Sept 30 of subsequent yr.

Water Needed for Human Consumption, Sanitation and Fire Protection (a)

	TM Data (b)	6/15/05 Model	2005 UWMP (c)	4/4/06 Model
SCWA Customer:				
Regular Customers				
Cotati	0.62	0.62		0.64 f
Petaluma	5.83	5.83	6.15	6.15
Rohnert Park	4.23	4.23	3.74	3.74
Sonoma	1.45	1.45	0.92	0.92
Windsor (Airport Service Area)		0.13 d		0.24 g
North Marin WD	5.80	5.80	6.04	6.04
Santa Rosa	13.74	13.74	13.48	13.48
Valley of the Moon WD	2.01	2.01	2.14	2.14
Other Agency Cust (Includes FWD)		0.45 d		0.48 g
Sub-Total				
Marin Muni. WD		17.1 e		18.4 h
Russian River Customers		unknown		unknown
Total				

Notes:

a Water needed for HC, S & FP is assumed to be equal to "inside" use for all retail customers. Inside use in turn is estimated by examining retail sales in the Winter months (generally Jan. and

b Estimate by West/Yost contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo).

c Total demand including UFW as determined by Maddaus for base year (Cal. 2004) of the 2005 UWMP. Indoor use is based on average of 2 lowest consecutive months in the winter if meters read bimonthly, or single lowest month if meters read monthly. Winter level use for Cotati supplied by Toni Bertolero (see Note f).

d

Avg Jan and Feb Aqueduct Sales* as	Windsor	Other Ag Cust
Avg af/mo (2000->03, SCWA, Kiergan Pegg	11.5	40.6
Avg mgd	0.13	0.45

* In the case of Windsor (ASA only) and Other Agency Customers, winter level demand is unknown and is therefore estimated from Aqueduct sales, it being assumed that all Winter demand is met from the Aqueduct.

e MMWD customer Avg per capita use in Jan and Feb for (2000 - 03), mgd, Dana Roxon,

f Avg. Jan and Feb Aq plus Local use FY 2003 -> FY 2005, Tony Bertolero via Matthew Damos

g Avg. Jan and Feb Aq Sales w. Billing Days for FY 2003 -> FY 2005 from Kiergan Pegg,

h From MMWD Water Watch Reports, avg demand for period noted, mgd

Week Ending:	For period noted to left	For same week one yr earlier
2/26/2006	17.6	17.6
2/19/2006	18.4	18.3
2/12/2006	18.8	19.1
2/5/2006	18.2	18.6
1/29/2006	18.4	18.5
1/22/2006	18.5	18.7
1/15/2006	17.9	18.6
1/8/2006	18.5	18.8
1/1/2006	18.1	18.5
Avg Winter	18.3	18.5
Avg for both yrs	18.4	

Reasonable Annual Need, afa (a)
(Avg. Aq. Sales or RR Diversions for FY's Indicated)

	6/15/05 Model	4/4/06 Model
		Avg for FY 03-04 and
Regular Customers	FY 03-04	FY 04-05
Cotati	1,071	1,045
Petaluma	11,294	10,636
Rohnert Park	4,710	4,835
Sonoma	2,611	2,403
Windsor (Airport Service Area)	474	448
North Marin WD	9,498	9,242
Santa Rosa	24,421	23,584
Valley of the Moon WD	3,157	3,036
Other Agency Cust (Includes FWD) (b)	1,326	1,318
Sub-Total	58,561	56,547
Marin Muni. WD	7,792	7,823
Russian River Customers (c)	3,928	3,819
Total	70,281	68,188

Notes:

a SCWA Aqueduct Sales Records, Kiergan Pegg, SCWA. Note that Surplus sales are not included.

b SCWA Aq. Sales Records. Excludes Windsor and includes FWD as proposed in Restructured WS Agree.

c Average of Water Yr Diversions for 2003 and 2004 was used for 6/15/05 Model and avg. of 2004 and 2005 was used for 4/4/06 Model. (see RR Cust sheet).

Local Potable Water Supply Available to SCWA Customers, afa

	Local Supply (a)	Contingency Factor (b)	Est'd Safe Yield (c)
Regular Customers			
Cotati	240	10%	216
Petaluma	831	10%	748
Rohnert Park	2308	10%	2,077
Sonoma	80	10%	72
Windsor (Airport Service Area)	0	10%	0
North Marin WD	2000	10%	1,800
Santa Rosa	1700	10%	1,530
Valley of the Moon WD	595	10%	536
Other Agency Cust (Includes FWD) (d)	0		0
Sub-Total	7754		6,979
Marin Muni. WD Local Sys. Safe Yield (e)			20,500
Russian River Customers (d)	0		0
Total			27,479

Notes:

a Based on 4-yr avg: 2000-2003 as reported in Sept 33, 2004 Tech. Memo to Santa Rosa

b To account for well equipment problems/maintenance down-time, etc. Estimated by JONWRM

c It is recognized that the quality of Local Supply varies. Presented here is the yield (safe yield) that is expected to be available in the first year of a water supply deficiency based on Local Water Supply capacities..

d Unknown and therefore assumed to be "0" for the purposes of this model. Needs to be determined by SCWA.

e Safe Yield of Local Supply System provided by MMWD. Source: Dana Roxon, 5/31/05.

Most Recent Service Area Population

SCWA Customer:	TM Data for Yr 2003		6/15/05 Model		2005 UWMP	4/4/06 Model	
Regular Customers							
Cotati	6,825		6,825			7,337	e
Petaluma	57,050		57,050		58,057	58,057	
Rohnert Park	42,300		42,300		42,329	42,329	
Sonoma	10,252		10,252		10,502	10,502	
Windsor (Airport Service Area)			1,338	d		2,495	f
North Marin WD	56,000		56,000		55,587	55,587	
Santa Rosa	153,400		153,400		155,121	155,121	
Valley of the Moon WD	23,000		23,000		22,646	22,646	
Other Agency Cust (Includes FWD)	8,000	a	8,000			8,080	g
Sub-Total			358,165			362,154	
Marin Muni. WD	184,999	b	184,999			189,945	h
Russian River Customers	27360	c	27,360			27,634	g
Total			570,524			579,733	

Notes:

a Estimate by West/Yost contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo).

b Estimate provided by MMWD to West/Yost and contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo).

c Estimate by West/Yost contained in Allocation Table prepared for City of Santa Rosa (Sept 23 Tech Memo). Includes 24,350 I(2003 Department of Finance estimate for the Town of Windsor) and an estimate of 3,000 for the RRCWD service area.

d Windsor Airport Service Area is primarily Commercial and Institutional use. An equivalent population is estimated by dividing avg Winter use by 95 gpcd, the wt'd avg. per capita use determined by West/Yost.

e Cotati pop. per Dept of Finance data as of 1/1/2005, Cristina Goulart, Winzler & Kelly

f Windsor Airport Service Area is primarily Commercial and Institutional use. An equivalent population is estimated by dividing avg Winter use by 94 gpcd, the wt'd avg. per capita use determined in the 2005 UWMP.

g Population estimated for 6/15/05 Model increased by an assumed growth rate of 1%.

h MMWD 2004 Pop., provided by Dana Roxon, MMWD, Mar. 2006.

Other Data:

From 2005 UWMP, population for 2004:

FWD population	2,201
Windsor RR Service Area	24,899

Winter Level Per Capita Demand, gpcd

	TM Data (a)	6/15/05 Model	2005 UWMP (b)	4/4/06 Model	
Regular Customers					
Cotati	89	89		88	c
Petaluma	101	101	106	106	
Rohnert Park	96	96	88	88	
Sonoma	136	136	88	88	
Windsor (Airport Service Area)		95		94	
North Marin Water Dist.	99	99	109	109	
Santa Rosa	87	87	87	87	
Valley of the Moon Water Dist.	87	87	94	94	
Other Agency Cust (Includes FWD)		unknown		94	
Sub-Total					
Marin Muni. Water Dist.		92		97	c
Russian River Customers					
Wt'd Avg	95			94	d

Notes:

a Source: TM Data sheet by West Yost and Assoc. Winter level use is based on avg. use in Jan, and Feb. of 2000 through and including 2003.

b Source: Bill Maddaus Tech. Memos - Includes Unaccounted For Water (UFW). Inside use is calculated from calendar 2004 retail sales records and is based on average of 2 lowest consecutive months in the winter if meters are read bimonthly, or single lowest month if meters read monthly.

c Calc'd from Winter level demand (See Human sheet) and est'd pop. (See Pop Sheet)

d Data for 11th Amend. Agree. Primes:

	gpcd	pop
Cotati	88	7,337
Petaluma	106	58,057
Rohnert Park	88	42,329
Sonoma	88	10,502
NMWD	109	55,587
Santa Rosa	87	155,121
VOM	94	22,646
FWD	99	2,201
Wt'd Avg. (using pop. as weighting factor)	94	

Other Data:

From 2005 UWMP, Winter Level Use, gpcd:

FWD	99

Demand Hardening Factor - Used for Adjusting Reasonable Need in Current Allocation

	Total Demand mgd 1		Total gpcd 2		Use in 3/27/06 Model 3		Lesser of Col. 3 or Average 4	Demand Hardening Adj Factor (Avg / Col. 4) 5
Regular Customers								
Cotati	1.07	b	146	d	146		146	1.14
Petaluma	10.19	c	176	d	176		167	1.00
Rohnert Park	5.95	c	141	d	141		141	1.19
Sonoma	2.25	c	214	d	214		167	1.00
Windsor (Airport Service Area)			172	e	172		167	1.00
North Marin Water Dist.	10.58	c	190	d	190		167	1.00
Santa Rosa	22.57	c	146	d	146		146	1.15
Valley of the Moon Water Dist.	3.40	c	150	d	150		150	1.11
Other Agency Cust (Includes FWD)					167	f	167	1.00
Sub-Total								
Marin Muni. Water Dist.					140	g	140	1.19
Russian River Customers					167	f	167	1.00
Average for Water Contractors (h)			167					

Notes:

a Sec 3.5(c)(2) provides that in determining "reasonable requirements" the SCWA may take into account hardening of demand resulting from the level of conservation achieved by a given customer of the SCWA.

b From Toni Bertolero. Avg of RR Purchases and Ground Water Production for FY 2003->05, mgd

c Total demand including UFW as determined by Maddaus for base year (2004) 2005 UWMP.

d Col 1 divided by population. See Pop sheet.

e There are no residents in Windsor ASA therefore per capita demand set equal to Windsor RR Service Area average value as determined for base year (2004) of 2005 UWMP.

f No data available so assumed equal to average value for Water Contractors.

g From MMWD 2005 Fact Sheet - avg demand for 10 yrs ending 2005, m 26.6 divided by population (See Pop sheet).

Other Data from 2005 UWMP for Base Yr 2004:

	mgd	gpcd
Forestville Water Dist.	0.48	219
Windsor RR Service Area	4.29	172

SUPPORT TABLES
For Tech Memo

Table A-1. Average Monthly Retail Sales (acre-feet) for SCWA Water Contractors in January & February[a]

Contractor	2000	2001	2002	2003	4-Year Average[b]
Santa Rosa	1,263	1,316	1,265	1,154	1,249
Petaluma	553	538	515	514	530
North Marin	563	554	525	468	528
City of Rohnert Park	406	406	356	373	385
Cotati	45	73	58	50	57
Forestville [c]	22	23	24	21	22
City of Sonoma	136	135	133	122	131
Valley of the Moon	182	189	187	174	183

Table A-2. Historical Population[d]

Contractor	2000	2001	2002	2003
Santa Rosa	147,595	149,300	151,700	153,400
Petaluma	53,710	54,510	55,850	57,050
North Marin	55,000	56,000	56,000	56,000
Rohnert Park	42,236	42,200	42,150	42,300
Cotati	6,471	6,600	6,861	6,825
Forestville [e]	1,973	Not Available	Not Available	Not Available
Sonoma	10,091	10,131	10,172	10,252
Valley of the Moon	20,512	21,996	22,923	23,000

Table A-3. Per Capita Demand (gpcd) for SCWA Water Prime Contractor in Winter (January & February) [a,f]

Contractor	2000	2001	2002	2003	4-Year Average [b]
Santa Rosa	90	93	88	79	87
Petaluma	108	104	97	95	101
North Marin	108	104	99	88	99
Rohnert Park	101	101	89	93	96
Cotati [g]	72	116	89	78	89
Forestville	115	123	126	113	119
Sonoma	142	140	138	125	136
Valley of the Moon	93	90	86	80	87
Simple Average [h]	104	109	101	94	102
Weighted Average [i]	99	100	93	87	95

[a] Data obtained from water sales data from the Prime Contractor

[b] Simple average of the last 4 years. Using Santa Rosa in Table A-1: (1,263+...+1,154)/4 = 1,249 acre-feet

[c] Data for Forestville obtained from the SCWA

[d] Data obtained from the Prime Contractor, California Department of Finance Website, or the 2000 UWMP for Sonoma County unless specified otherwise

[e] Population for Forestville obtained from the 2000 SCWA UWMP

[f] Based on populations from Table A-2, if population for particular year was not available, then population for year 2000 was used

[g] For 2001 & 2002, based on Dec/Jan instead of Jan/Feb because Cotati did not provide Feb; 2003 is based on Jan/Feb

[h] Simple average of the eight individual gpcds. Using 2000 of Table A-3: (90+...+93)/8 = 102 gpcd

[i] Weighted average for population. Using 2000 of Table A-3: (90*147,595+…+93*20,512)/(147,595+…+20,512) = 98 gpcd

Current Allocation Model

Allocation of Water During a Period of Deficiency Pursuant to Sec. 3.5 (a) of the Restructured Agreement for Water Supply

Based on CURRENT Level Demands and Water Available from the SCWA of 60,000 afa

This equates to an overall cutback in Russian River water supply of: 12.0%

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	23	41	42	43
		Entitlement Limits		Minimum Needs		Reasonable Requirement					Local Supply		HC, S & FP Per Capita Demand				First Allocation & Test		Second Allocation		Results	
SCWA Customers	Assumed Available Supply afa	Entitlement (Maximum Daily Rate of Flow During any Month) mgd	Annual Entitlement Limit (Cap) afa	Water Needed for Human Consumption, Sanitation and Fire Protection **** mgd	afa	Apparent Reasonable Requirement afa	Demand Hardening (DH) Adjust. Factor	Adjust'd Reason. Req't	Final Reason. Req't	Lesser of Reason. Req't vs Annual Cap afa	Safe Yield of Local Supply afa	Pop. persons	Avg. Winter Level Per Capita Demand gpcd	Weighted Avg Per Capita Demand of Water Contractors gpcd	Portion of Per Capita Demand that can be served by Local Supply gpcd	Per Capita Demand that is not met by Local Supply ("First" Allocation Parameter) gpcd	"First" Allocation (Water req'd for HC, S & FP) afa	TEST Less Than Annual Entitlement Limit?	Normalized Entitlements ("Second" Allocation Parameter) %	"Second" Allocation afa	"First" plus "Second" Allocations afa	TEST Less Than Reasonable Req't ?
Regular Customers																						
Cotati*		3.8	1,520	0.64	720	1,045	1.14	1,196	1,095	1,095	216	7,337	88	94	26	68	558	Yes	2%	536	1,095	Yes
Petaluma*		21.8	13,400	6.15	6,893	10,636	1.00	10,636	9,735	9,735	748	58,057	106	94	11	83	5,379	Yes	13%	3,574	8,952	Yes
Rohnert Park*		15	7,500	3.74	4,186	4,835	1.19	5,731	5,246	5,246	2,077	42,329	88	94	44	50	2,390	Yes	9%	2,459	4,849	Yes
Sonoma*		6.3	3,000	0.92	1,029	2,403	1.00	2,403	2,200	2,200	72	10,502	88	94	6	88	1,036	Yes	4%	1,033	2,069	Yes
Windsor (Airport Service Area) (ASA)*		1.5	900	0.24	263	448	1.00	448	410	410	0	2,495	94	94	-	94	263	Yes	1%	146	410	Yes
North Marin Water Dist. (NMWD)*		19.9	14,100	6.04	6,767	9,242	1.00	9,242	8,459	8,459	1,800	55,587	109	94	29	65	4,066	Yes	12%	3,262	7,328	Yes
Santa Rosa*		56.6	29,100	13.48	15,094	23,584	1.15	27,027	24,737	24,737	1,530	155,121	87	94	9	85	14,840	Yes	35%	9,279	24,118	Yes
Valley of the Moon Water Dist.*		8.5	3,200	2.14	2,397	3,036	1.11	3,372	3,086	3,086	536	22,646	94	94	21	73	1,854	Yes	5%	1,232	3,086	Yes
Other Agency Cust (Includes FWD)		2.7	2,048	0.48	534	1,318	1.00	1,318	1,207	1,207	-	8,080	94	94	-	94	853	Yes	2%	354	1,207	Yes
Sub-Total		136.1	74,768	33.82	37,884	56,547		61,374	56,173	56,173	6,979	362,154					31,239				53,114	
Marin Muni. Water Dist.		0	14,300	18.39	20,605	7,823	1.19	9,309	8,520	8,520	20,500	189,945	97	94	96	0	0	Yes	13%	3,391	3,391	Yes
Russian River Customers***		0	5,025	unknown	2,916	3,819	1.00	3,819	3,495	3,495	-	27,634	unknown	94	-	94	2,916	Yes	4%	579	3,495	Yes
Total		136.1	94,093		61,404	68,188		74,501	68,188	68,188	27,479	579,733					34,155		100%	25,845	60,000	
Reasonable Need Remaining Unmet																	25,845					
Water Available for Allocation	60,000																					

Definitions:

* Defined in Restructured Water Supply Agreement as "Water Contractors"

** FWD = Forestville Water Dist.

*** SCWA Russian River Contractors whose direct diversions and points of diversion have been approved and come under the auspices of the SCWA's Water Rights (Town of Windsor and Russian River County Water Dist.)

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UFW = unaccounted for water (ie water due to losses, leakage, theft and unmetered deliveries, meter inaccuracies, fire hydrant flows, pipeline flushing, etc.)

af = ac-ft mgd = millions of gallons per day

afa = ac-ft per annum (year) gpcd = gallons per capita per day

Column Explanations:

1 All Customers of the SCWA except customers served Surplus Water. Surplus Water users are not allowed an allocation during periods of water deficiency.

2 Water supply assumed to be available to SCWA for delivery to or diversion by its Customers. In the event of a real drought, this value is predicted by SCWA using its Russian River models and including estimated yield from the SCWA's wells and deducting losses from the Aqueduct

3 & 4 Entitlement limits pursuant to Restructured Agreement. Note that agreement does not specify an Annual Entitlement Limit (cap) for Other Agency Customers so this have been estimated by escalating the avg of FY 2003 and FY 2004 demand by 2% per year growth and then adding a 10% contingency. MMWD "annual entitlements" are set forth in agreements between SCWA and MMWD. Russian River Customers entitlements are based on agreements the SCWA has with these respective customers taking into account points of diversion authorized to be covered under SCWA's water rights. See Entitlement sheet and RR Cust sheet for details.

5 Water for HC, S & FP is assumed to be fairly represented by "inside demand" for all metered uses and including an adjustment factor for UFW. Inside demand is in turn estimated by examining winter level demand, a requirement of the Restructured Agreement. Values used in this model are from the base year (cal. yr 2004) compiled for the 2005 UWMP. See "Human" sheet for details.

6 Prior column extended over the entire year and converted to afa.

7 Reasonable Requirement is assumed to be equal to annual deliveries made to Customers in a recent non-drought year. For the purposes of this analysis, The avg. for FY 2003-04 and 2004-05 deliveries were used. In future analyses, an average of the immediate past 3 years is recommended. In the case of this analysis, going back further in time was not done due to significant changes in aqueduct demand by the City of Rohnert Park.

8	Sec 3.5(c)(2) provides that in determining "reasonable requirements" the SCWA may take into account hardening of demand resulting from the level of conservation achieved by a given customer of the SCWA. This column contains a Demand Hardening adjustment factor derived from annual per capita demand taking into account all uses and including UFW. Information compiled for the base year (2004) for the 2005 UWMP was used. See DH Factor sheet for details.
9	Col 8 x Col 7.
10	Col 10 "normalizes" Col 9 such that sum of all adjusted reasonable requirements is equal to original sum of Reasonable Requirements. Col 9 x (sum of Col 7 / sum of Col 9). This column is then used to define the "Reasonable Requirement" that is referred to in Sec. 3.5(a)(3)(iii) of the Restructured Agreement.
11	Lesser value comparing Reasonable Requirement to Annual Entitlement Limit as stipulated in Section 3.5 (2) (3) (iii). This is the value used for testing to see that the total of the "First" and "Second" allocation of water to a given customer is reasonable.
12	Local supplies are based on an estimate by JONWRM of "safe yield" of same. For Water Contractors, the data reported to West/Yost is the basis for the estimate. See Local sheet for details. The "safe yield" used for MMWD was provided by MMWD. It is noted that data is missing fc Other Agency Customers and Russian River Customers. It is important that SCWA develop an on-going data collection system to at all times know potential local supply yield in order to achieve accuracy necessary for the allocation calculatio
13	Detailed population estimates from Census tract data compiled by Maddaus for the base year (cal. 2004) used in the 2005 UWMP. See Pop sheet for details and explanation of exceptions.
14	Winter level per capita demand determined by Maddaus for the base year (cal. 2004) used in the 2005 UWMP. See GPCD sheet for detailed explanation.
15	Weighted avg. of per capita winter level demand for existing Prime contractors. See GPCD sheet.
16	Safe yield of Local Supply expressed as a per capita value using population data shown i.e. Col 12 * 7.48 * 43,560 / (365 * Col 13).
17	HC, S & FP demand not met by Local Supplies and calculated as follows: If Wt'd average per capita demand (Col 15) is greater than the portion of per capita demand met by Local Supply (Col 16), the difference of the two is entered in this column, if not, "0" is entered.
18	"First" allocation calculated as follows: If Local Supply safe yield (Col 12) is greater than Winter level demand extrapolated for the full year (Col 6), then "0" is allotted, if not the portion of per capita demand not met by Local Supply (Col 17) is calculated for the year for the entire population, expressed in afa and entered here. In the case of consecutive drought years, it is important that Col 12 values (safe yield of local supplies) be updated in order for this calculation to be accurate. This is especially true for contractors relying on surface water supplies such as NMWD and MMWD whose surface supplies drop sharply when faced with consecutive drought years.
19	Test to see that "First" allocation does not exceed respective Entitlement Limits as required by Section 3.5 (a)(3)(i).
20-22	These three columns combine the entitlements of the Regular Customers (which pursuant to Sec. 3.5(a)(3)(ii) must be derived from the avg. daily rate during any month - mgd values contained in Sec. 3.1) and the contractual entitlements of MMWD and RR Customers which are expressed in ac-ft per year values contained in their contracts. These relative entitlements are first converted to %'s, then added together.
24	This column "normalizes" the combined entitlement shares such that the sum of all entitlement shares adds to 100%. The resulting %'s are then used to distribute the "Second" allocation of water called for by Sec. 3.5(a)(3)(ii).
25-40	These cells contain the iterative trials necessary to arrive at the "Second" allocation of water. The process is iterative as the Test of whether the "Second" allocation is valid or not is set forth In Section 3.5 (b) (3) (iii) and requires that (in addition to not exceeding the Entitlement Limit) th sum of the "First" allocation (Col 18) and the "Second" allocation not exceed the "Reasonable Requirement" (Col 10)

Future Allocation Model

Allocation of Water During a Period of Deficiency Pursuant to Sec. 3.5 (a) of the Restructured Agreement for Water Supply

Based on FUTURE Level Demands and Water Available from the SCWA of **60,000 afa**

This equates to an overall cutback in Russian River water supply of: **36.2%**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	20	38	39	40	41
		Entitlement Limits		Minimum Needs		Reasonable Requirement		Local Supply		HC, S & FP Per Capita Demand				First Allocation & Test		Second Allocation		Results		
SCWA Customers	Assumed Available Supply afa	Entitlement (Maximum Daily Rate of Flow During any Month) mgd	Annual Entitlement Limit (Cap) afa	Water Needed for Human Consumption, Sanitation and Fire Protection **** mgd	afa	Reasonable Requirement afa	Lesser of Reasonable Requirement vs Annual Cap afa	Safe Yield of Local Supply afa	Pop. persons	Avg. Winter Level Per Capita Demand gpcd	Weighted Avg Per Capita Demand of Water Contractors gpcd	Portion of Per Capita Demand that can be served by Local Supply gpcd	Per Capita Demand that is not met by Local Supply ("First" Allocation Parameter) gpcd	"First" Allocation (Water req'd for HC, S & FP) afa	TEST Less Than Annual Entitlement Limit?	Normalized Entitlements ("Second" Allocation Parameter) %	"Second" Allocation afa	"First" plus "Second" Allocations afa	TEST Less Than Reasonable Req't ?	Amount Falling Short (-) of Reasonable Req't afa
Regular Customers																				
Cotati*		3.8	1,520	0.64	720	1,520	1,520	216	7,337	88	94	26	68	558	Yes	2%	599	1,157	Yes	-363
Petaluma*		21.8	13,400	6.15	6,893	13,400	13,400	748	58,057	106	94	11	83	5,379	Yes	13%	3,434	8,813	Yes	-4,587
Rohnert Park*		15	7,500	3.74	4,186	7,500	7,500	2,077	42,329	88	94	44	50	2,390	Yes	9%	2,363	4,753	Yes	-2,747
Sonoma*		6.3	3,000	0.92	1,029	3,000	3,000	72	10,502	88	94	6	88	1,036	Yes	4%	992	2,029	Yes	-971
Windsor (Airport Service Area) (ASA)*		1.5	900	0.24	263	900	900	0	2,495	94	94	-	94	263	Yes	1%	236	500	Yes	-400
North Marin Water Dist. (MMWD)*		19.9	14,100	6.04	6,767	14,100	14,100	1,800	55,587	109	94	29	65	4,066	Yes	12%	3,135	7,201	Yes	-6,899
Santa Rosa*		56.6	29,100	13.48	15,094	29,100	29,100	1,530	155,121	87	94	9	85	14,840	Yes	35%	8,917	23,756	Yes	-5,344
Valley of the Moon Water Dist.*		8.5	3,200	2.14	2,397	3,200	3,200	536	22,646	94	94	21	73	1,854	Yes	5%	1,339	3,193	Yes	-7
Other Agency Cust (Includes FWD)**		2.7	2,048	0.48	534	2,048	2,048	-	8,080	94	94	-	94	853	Yes	2%	425	1,278	Yes	-770
Sub-Total		136.1	74,768	33.82	37,884	74,768	74,768	6,979	362,154					31,239				52,680		-22,087
Marin Muni. Water Dist.		0	14,300	18.39	20,605	14,300	14,300	20,500	189,945	97	94	96	0	0	Yes	13%	3,259	3,259	Yes	-11,041
Russian River Customers***		0	5,025	unknown	2,916	5,025	5,025	-	27,634	unknown	94	-	94	2,916	Yes	4%	1,145	4,061	Yes	-964
Total		136.1	94,093		61,404	94,093	94,093	27,479	579,733					34,155		100%	25,845	60,000		-34,093
Reasonable Need Remaining Unmet														25,845						
Water Available for Allocation	60,000																			

Definitions:

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af = ac-ft mgd = millions of gallons per day

afa = ac-ft per annum (year) gpcd = gallons per capita per day

Column Explanations:

All are same as shown on Current Model sheet except for below:

7 Reasonable Requirement is set equal to the Annual Entitlement limit (cap) in order to estimate the allocation in the future when SCWA Customers reach (or exceed) their Annual Entitlement (or contract) Limits.

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